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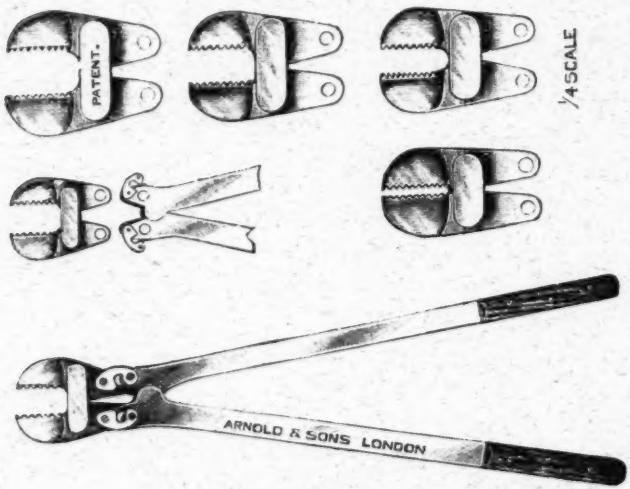

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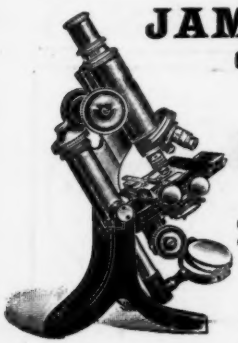

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THE

VETERINARY JOURNAL

MAY, 1911.

Indexed B. A. I.

Editorial.

SCARLET FEVER IN RELATION TO COW'S MILK.

THE very excellent article on the above subject by Mr. W. Hunting, which we reproduce in this issue of the VETERINARY JOURNAL, is a masterly resumé and criticism of the evidence that has been brought forward to support the contention of many medical authorities that scarlet fever in the human subject may have a bovine origin. In common with the vast majority of the members of the veterinary profession, Mr. Hunting disagrees with those medical men and his arguments appear to us to be unanswerable. In this case, as in some other diseases of man which have been attributed to the cow, the failure to find a human source for the contamination of the milk is a very long way from proving that the cow is suffering from that disease. That these diseases may be milk borne is quite a different matter, and is, of course, beyond dispute, but that is just as easily the result of human contamination as of bovine origin, since the milk is drawn by human agency and is handled as a rule by various changes of men before it is consumed. None of the reported cases of bovine origin will bear really searching investigation, and we should think it almost impossible for anybody reading Mr. Hunting's searching account of the famous Hendon outbreak to come to any other conclusion than that the cows must be acquitted of any share in the origin of the disease. In the discussion that followed the delivery of the paper, many prominent medical officers of health took part, and it is gratifying to note that there were very few supporters of the old theory left, although some were not satisfied to give

the cow a clean slate in this connection. But, as Mr. Hunting pointed out, nobody has yet shown that the cow could be infected with scarlet fever. All experimental efforts to infect cows had negative results. Dr. Louis Parkes agreed with Mr. Hunting that there is no evidence that scarlet fever is a disease of bovines transmissible through milk to man. But while admitting this, he put forward a very interesting theory suggesting the possibility of ulcerated teats being inoculated with the scarlet fever organism by the hands, &c., of a milker who might himself have a concealed attack or be a carrier. In this way he thought it possible for a cow to act as an intermediary between a human source of scarlet fever and the consumer of the milk. More recently Dr. Savage has put forward a similar theory at a meeting of the Epidemiological Section of the Royal Society of Medicine. He suggests "(*a*) That the cow may be a source of human disease, not because it is constitutionally infective, but because it is acting as a carrier of human infective organisms, and (*b*) that disease (not including tuberculosis) of the milk-producing organs of cows is only likely to be harmful to man when the causally associated organisms are of human origin or when human organisms are superadded as a secondary infection." This theory is certainly interesting and worthy of further examination, but Dr. Parkes dealt it a severe blow when he pointed out that it was very doubtful if the scarlet fever organism would survive for long on an ulcerated teat in association with the countless septic organisms on the ulcerated surface. Until the causal organism of scarlet fever is isolated and identified very little progress can be made in elucidating these outbreaks.

The veterinary profession has been for years looking in vain for evidence of scarlet fever in cows. We might almost be forgiven if we expressed a hope for some positive proof, for if the cow were proved to be a definite source of danger it would make more work for veterinary surgeons and expedite the institution of a more complete system of inspection of dairy cows.

General Articles.

SCARLET FEVER IN RELATION TO COW'S MILK.*

Indexed B. A. I.

By W. HUNTING, F.R.C.V.S.
London.

Milk-borne epidemics are not uncommon, and are characterized by the outbreak of disease being sudden in onset and wide in distribution. When the method of spread of such infections is discovered the law provides for the immediate control of the mischief by prohibiting the sale of the milk. This action prevents further infection, and affords time for inquiry into the way in which the milk became contaminated.

If scarlet fever is due to a specific organism and is a disease peculiar to human beings we should naturally look for a human source of infection in all outbreaks. In ordinary outbreaks unconnected with milk no one looks for an animal as the source of infection; it is assumed that infection has been carried by a human being. In the majority of milk-borne outbreaks the infection has been traced to a human source; in fact, it is uncontroversial that milk may be contaminated directly by persons suffering from scarlet fever, or indirectly by attendants on a scarlet fever patient.

There have been milk-borne outbreaks in which careful inquiry has failed to detect any case of scarlet fever in human beings connected with the collection or distribution of the milk. This failure to detect the source of infection, to know how the first case arose, is a not uncommon event in many cases where an epidemic appears. Sometimes the inquiry is too limited, sometimes there are urgent reasons for anyone having knowledge to keep their secret, and sometimes the infecting person does not suspect the mischief he has done or is doing. To quietly assume that the non-discovery of a human source of infection is evidence that no human source exists is hasty and illogical.

Probably milk-borne outbreaks of disease would have been accepted by everyone as due to human infection had not a too fertile brain formed a theory that some human ailments arose by infection from animals showing no signs of any recognized

* Presidential Address at the Veterinary Section of the Congress of the Royal Sanitary Institute at Brighton.

disease. This theory accounts for the belief that cows may suffer from some morbid condition which so contaminates their milk that its consumption by human beings leads to the development of scarlet fever. Veterinarians have so far failed to recognize any such condition in cows, and they believe that no sufficient evidence has yet been brought forward to warrant the statement that scarlet fever of man can be traced to the cow.

In all the outbreaks of scarlet fever that have been supposed to arise from some disease of the cow there has been found an eruption on the teats of the animals. The inference from this is that the mysterious morbid condition of the cow has at least one definite symptom. But the value of this symptom is reduced to a minimum when we know that few herds of milch cows are free from skin lesions on the udder and teats. Cracks, abrasions, sores, scabs, and ulcers are produced by various causes and by some well-recognized diseases. They exist, constantly, in cowsheds from which no human disease has been traced. They become infected with the ubiquitous streptococci, and this infection is carried from cow to cow by the hands of the milker. Something more than an eruption on the udder of cows must be discovered before even a sore throat in man consuming the milk can be rationally connected as cause and effect.

Scarlet fever is in many cases difficult to diagnose. Some cases are very slight, some quite atypical, and many are infectious long after any definite signs of the disease remain on the patient. It must then be easy for milk to become contaminated after leaving the cow. In fact, it only requires contact with any of these unrecognized human carriers. In my own sphere of practice outbreaks of glanders, foot-and-mouth disease or swine fever have often occurred, and the most careful inquiry failed to trace the source of infection. We rest satisfied that there was an animal source, but that we were unable to trace it.

The hypothesis that outbreaks of milk-borne scarlet fever might be due to some undefined disease of the cow has not been much in evidence of late years. A report by Drs. Hamer and Jones upon an epidemic of scarlet fever in London and Surrey in 1909 has, however, revived it. A brief review of this report will, I think, show that no fresh evidence has been adduced to support the theory, but that it still rests solely upon the two conditions first adumbrated by Sir W. Power in 1885, (*a*) failure

to find a human source; and (*b*) the discovery of an udder eruption: two conditions affording insufficient basis for any assumption that the cow can cause scarlet fever in man. The facts of this outbreak are as follows:—

In June, 1909, outbreaks of scarlet fever appeared at Worcester Park, Kingston, Westminster, Chelsea, Wandsworth, and Croydon. These were traced to a milk supply distributed from ten or twelve depôts. After a most painstaking and ingenious investigation the infected milk was found to have come from one depôt supplied by thirty-one farms. These farms were examined, and very quickly farm X was recognized as the only one which could be directly connected with all the outbreaks.

The first notifications of disease were made on June 14 and 15, and reports of fresh cases by medical officers of health continued to come in till June 18. The milk supply was stopped on the 19th.

Farm X consisted of two farmsteads distinguished as X 1 and X 2, each having separate herds of cows, although the milk from both may have been mixed. Half a mile from the farm was the cottage of the carter whose daily work was to take the milk from the farm to the depôt. He also lent a hand in milking the cows at both farmsteads whenever his help was required. This carter, G. L., generally went first to get the milk from X 2, milked two cows there morning and evening, helped to lift the churns into the cart, and then proceeded to X 1 where he also occasionally milked a cow before taking the churns to the depôt.

At this man's cottage on June 20, the reporters found him, his wife and three children, all suffering from scarlet fever. The first child had sickened on June 11, the next on June 13, the father on the 14th, the wife and third child on the 15th. The carter stopped work on the 15th, having milked two cows on the preceding evening.

At farmstead X 1 lived the farmer, his wife, and her sister, and the foreman milker. There had been no illness on the premises since Easter, when the foreman had influenza. There were twenty-seven cows at this place, "one with a cough."

At farmstead X 2 lived a milker, his wife, and her mother, and six children, all apparently in good health. There were thirty-two cows on the place. Several had recently calved, "and the condition of three excited suspicion."

This, I think, is a fair but condensed account of the facts as given by the authors of the report. At first sight it would seem to be a clear case of human infection by the carter G. L.; but the reporters conclude that he and his family were infected by the milk, just as were the persons in the different districts mentioned, and they trace the source of infection to some disease of the cows.

Of course the carter could not be the source of infection if milk consumers outside of the farms had been seized with scarlet fever previous to his being attacked. His child showed symptoms of the disease on June 11; the earliest notified case was on June 14, which allows ample time for infection through the milk after contamination by the carter or his family. But the reporters meet this difficulty by ante-dating the general outbreak to June 7 or 8. Their excuse for so doing is, "further inquiry, however, was made of the medical officer of health, who wrote as follows: 'The doctor who notified nearly all the cases on the 18th says he had several cases of sore throat during the week previous, not followed by rash and not notified.'" Surely this is begging the question, and assuming that the sore throats must have been scarlet fever, which is not proven. Milk-borne outbreaks of scarlet fever are peculiar for their suddenness, their almost explosive force. They do not commence in driblets of sore throats spread over many days. The report says: "It would appear that the milk distributed from farm X was infective on June 7, 8, 9, and 10, non-infective on June 11 and 12, and again infective on June 13." This statement may be evidence of the minute care taken by the inquirers, but it certainly does not point to a cow disease. From June 7 to 18 the milk was infective, and one cannot believe that for two days of this time the cows ceased to infect their milk if they were diseased. A very much more simple explanation is that carter G. L. did not on the 11th and 12th assist in milking any cows. We know he milked cows on the 14th, and stopped work on the 15th; we do not know whether he milked on June 11 and 12. We are between two possible explanations: either the cows or the carter's family infected the milk. If the carter and his family got scarlet fever by drinking cow-infected milk, how is it that the family, including six children, at X 2 did not suffer at the same time and in the same way? These

children were surely not immune, and their risk of infection was not less, as the cows at both farmsteads were found to have lesions on their teats, lesions of no special nature, but such as are found generally among milch cows.

Several cows were found presenting no teat-lesions, they had not been milked, although living under similar conditions to the others. This, it is claimed, militates against the assumption that the lesions were traumatic. I draw the opposite conclusion. They had not been milked, and so their teats were not abraded or injured by the hands of the milkers. They afforded no nidus for the development of the streptococci. They were in contact with the other cows, they were subject to the same surroundings. A disease capable of giving rise to scarlet fever in man can hardly be a mere local udder affection, and we may presume that if it were a general affection these cows ought to have been affected as were the others.

There is a mention in the report of three cows which had only recently calved, and a hypothesis is rather timidly put forward that this natural function of cows may in some way have brought about such a morbid condition as to render their milk capable of spreading scarlet fever among human beings consuming it. I suggest that this theory has no single fact to support it, and probably would never have been made had not Sir W. Power unfortunately anticipated it in 1882.

We cannot imagine a disease possessed of such potentialities as that the poor cow is assumed to have, without some definite symptoms. Is an udder eruption necessary? Is loss of hair and condition a sign? Is the act of parturition a factor? These conditions are common enough when no scarlet fever exists in the neighbourhood or in the sphere of the milk distribution. Until some more definite description of the supposed morbid state which enables cows to secrete scarlet fever is given, I think we are safe in denying that there is any real evidence against the cow.

The report of Drs. Hamer and Jones receives the support of the Medical Officer of Health to the London County Council, who says: "The question of infection of milk being of bovine origin needs to be considered. Under similar circumstances Sir W. Power, in 1882, when investigating an outbreak of scarlet fever in certain London districts, made the suggestion that

inasmuch as 'there is one sort of relation between scarlatina and accidents of the puerperal state, another sort of relation becomes comparatively easy of belief,' in fact, that 'if scarlatina in man have other animal source than human source, it may be that one such source is the cow that has recently calved, a cow not at all ill (except for her parturition) or not so obviously ill as to prevent her milk being used for human consumption.' The suggestion thus tentatively made in 1882 at once assumes large importance upon the demonstration by Sir W. Power, in 1885, of the bovine origin of scarlet fever occurring in persons consuming milk from a Hendon farm the cows at which were affected with an eruption of the teats and udder. A similar development of scarlet fever in man, associated with the consumption of the milk of similarly affected newly-calved cows or cows infected from such newly-calved cows has been observed in a number of instances since that date."

Sir Shirley Murphy uses the words "upon the demonstration by Sir W. Power in 1885 of the bovine origin of scarlet fever" at Hendon. These words assume that the interpretation of the etiology and pathology of the "Hendon disease" by Sir W. Power was correct and is established. Fortunately Sir G. T. Brown ordered an investigation into this Hendon outbreak, and his conclusions were vastly different from those of Sir W. Power. Before comparing some of the differences shown in the two reports I may draw attention to a rather suggestive fact. Since 1885 veterinarians have had their attention fixed upon Sir W. Power's theory. They have given careful observation to newly-calved cows, to udder eruptions, and to outbreaks of milk-borne scarlet fever in man. Not one of these observers has been able to trace any connection between scarlet fever and cow disease. Of course it may be retorted that they were wanting in knowledge or intelligence, an accusation I am willing to face.

I find in Swithinbank and Newman's standard work on "Bacteriology of Milk," 1903 edition, an outline of thirty-seven milk-borne outbreaks of scarlet fever; of these twenty-six were traced to a human source, and nine were alleged to be due to cow disease. These nine all start with the same negative evidence, failure to trace a human source, and they all seem to adopt the same line of reasoning as was initiated by Sir W. Power at Hendon.

A reconsideration of the Hendon case seems essential if we are to fairly investigate future milk-borne epidemics of scarlet fever. Only when Sir W. Power's account is generally accepted as proven can it be allowed as argument in other cases to say of any observation or inference that "it closely followed what was found in the Hendon case." If Sir W. Power was wrong, similar sources of error are to be found in the reports of investigators who have followed him.

The Hendon outbreak occurred about the end of November, 1885, and continued until the third week in December. Early in 1886 the Local Government Board published a report, by Sir W. Power and Dr. Klein, tracing the outbreak to a disease among cows on Mr. Panter's farm at Hendon. There is no dispute that the milk from the farm spread scarlet fever, and that the cows were affected with some udder disease. The question not settled is whether the udder disease was the cause of the scarlet fever, or whether it was only co-incidental and not causal. Sir W. Power and Dr. Cameron (the medical officer of health) maintained that no human source of contagion existed. Dr. Cameron's annual report for 1885 says: "In the last week of November two mild cases of scarlet fever came to my knowledge in 'The Mead.' Both were carefully isolated and disinfectants supplied. As the district is full of laundries it is possible that the disease came from London; there was no other evident source for it. The fever did not spread beyond either of these houses."

Sir W. Power's first argument in favour of the cow being the source of infection was that no human contagion could be traced. The "Mead" is 600 yards from Panter's cowsheds, and some of his men lived there. Dr. Cameron's statement that "the fever did not spread," can only mean that he was unacquainted with any spread. Clearly, too, he could only surmise how the Mead cases arose. The infection might have come from London with the dirty linen, it might have resulted from unrecognized cases at the Mead, and it might have been carried by infective persons visiting their friends there. If the source of the first case at the Mead cannot be traced, it is a large assumption to put aside as impossible a human source of infection of the milk.

This probability was ignored and search at once made for a

cow disease. Three newly-calved cows had been brought into the sheds on November 15. They suffered from an udder eruption which spread to other cows and was indistinguishable by its symptoms from the well-known appearances of cowpox. I quote the symptoms from Professor Crookshank's "Bacteriology." He says: "Dr. Cameron has given a detailed description of the clinical history of the disease. The teats became enlarged and œdematous. On handling them there was no feeling of induration. Vesicles appeared upon the swollen teats and upon the udder between or near the teats. These varied in number from two to four on a teat and in size from a pea to a horse bean. The vesicles contained a clear fluid. The vesicles were rubbed and broken in milking and left raw sores, sometimes red, in other cases pale in colour with raised ulcerated edges. Sometimes a few accessory vesicles formed around the margins of these ulcerated sores. After the rupture of a vesicle a brown scab formed which might remain attached for five or six weeks or fall off in ten days or a fortnight, a smaller one forming afterwards. A thin watery fluid exuded from under the scab and the sore ultimately healed. . . . . Some of the cows were also suffering from an eruption on the rump and hind quarters, consisting of patches of eczematous crusts. When the crusts were picked off the hair came with them exposing a raw moist sore. Dr. Cameron stated that he learnt the disease was capable of being communicated to milkers by inoculation with virus from the vesicles on the teats, though the milkers on the Hendon farm escaped. He adds that it was strongly asserted by several people who examined the cows that they were suffering from cowpox."

This description is a very good one of the lesions of cowpox, as seen by country veterinary practitioners in frequent outbreaks. The Local Government Board report denies that these were the symptoms of cowpox, because no papule had been observed, or subsequent formation of pustule, areola or pitting, and because the vesicles were not umbilicated. On which Crookshank comments: "These reasons given for dismissing the diagnosis of cowpox at Hendon were totally inadequate; a comparison having been made between the characters of an eruption of vaccinia as it appears on an infant's arm, instead of the eruption of the natural or so-called spontaneous disease on the teats of cows."

It has always seemed to me somewhat curious that the investigators of the Hendon disease should not have troubled to test the nature of the udder eruption by inoculating calves not with streptococci from old lesions, but with the clear contents of vesicles. The experiment might have given negative results, or it might have given the calf cowpox, and so rendered the nature of the eruption certain.

The Local Government Board report would have us believe that the udder disease was indicative of some special disease of the cow, capable of infecting human beings with scarlet fever if they consumed the milk, in short, that the disease of the cow was scarlet fever.

The veterinary department of the Privy Council, after a careful inquiry, also issued a report of the Hendon case, and arrived at the conclusion that the cow-disease was only cowpox, accidentally coincident with an untraced human infection of the milk. Professor Axe, one of the reporters, traced the three cows, purchased by Mr. Panter, as being part of a lot sent from Derby, some of which were sold to four different cowkeepers. To each of these men's farms the new cows carried an udder disease having the same appearance as the Hendon cases. Mr. R. Keevil saw the Hendon cases, and recognized them as the same as those on his farm. Mr. Vipon happened to be a surgeon, and to have seen previous outbreaks of cowpox. He diagnosed the disease in his new cows. Mr. J. Keevil had cases, and the nature of the disease was demonstrated by two of the milkers becoming infected on their hands. Dr. Bates, of Merton, informed Professor Axe that the men "suffered from a well-developed attack of vaccinia, contracted by them in milking."

The milk from all these different cowsheds passed into daily consumption; but no outbreak of scarlet fever was reported from the wide circles of their milk distribution.

Sir W. Power's report derived much strength from the work done by Dr. Klein, who was associated with him in the investigation of the Hendon and other similar outbreaks.

Dr. Klein discovered in the sores on the cows a micro-organism similar to one he found in human beings suffering from scarlet fever. In August, 1891, Dr. Klein contributed a paper to Section III of the International Congress of Hygiene and Demography on "Infectious Udder Diseases of the Cow."

In it he says: "The micro-organism which I isolated from the Hendon cows and from cases of human scarlet fever I still firmly maintain to be the micro-organism of scarlet fever, viz., the *Streptococcus scarlatinæ*." If this is still Dr. Klein's position it is unnecessary to refer further to the bacteriology of the question. No other pathologist believes that a streptococcus is the causal organism of scarlet fever, although it is often associated with that disease, as it is with many other diseases both of man and animals.

One would naturally expect that some experiments would have been undertaken to infect bovines with scarlet fever virus. If that had been successfully done a long step would have been made to show that animals were susceptible to the disease, and might therefore transmit it to human beings. Many such experiments have been made, but only with negative results. The materials used were blood, peelings, and mucus from the throat. The attempts to infect were by subcutaneous injection, by ingestion, and by contact with mucus-lined passages.

Experiments were also made with cultures of the streptococcus, which were injected under the skin and gave rise to septicæmia. Injection of cultures of streptococci collected from patients not suffering from scarlet fever or from udder diseases have also been made, and have given rise to similar septicæmic symptoms and lesions.

In the report of Drs. Hamer and Jones it is asserted that the udder eruption was not cowpox, and the symptoms detailed by Mr. Duncan, veterinary inspector, support that negative diagnosis. There is a number of recognized diseases of cows' udders characterized by an eruption. Cowpox is distinct; so is the eruption found on the udders of cows in Edinburgh in 1887. So also are the common lesions (sores, cracks, and abrasions) which are simple until aggravated by the milkers' hands and infected with the ubiquitous streptococci. All have been suspected by observers looking for cow-disease to explain a mysterious infection of milk. All have existed at many places and often, when no scarlet fever prevailed among the milk consumers. When an udder disease of cows is found in a cowshed the milk from which spreads scarlet fever, I think we may safely acquit the cow of any share in the outbreak and concentrate attention upon finding a human source of infection.

THE OCCURRENCE OF ACTINOMYCOSIS IN COWS' UDDERS.

By J. HUME PATTERSON, L.R.C.P. & S.Ed.

Bacteriologist for the County of Lanark.

Indexed B. A. L.

In any literature I have read on the subject of Actinomycosis, little mention is made of the lesion as occurring in the udder of the cow, whereas the disease in the mammary gland of the pig appears to be fairly common; one observer, Rasmussen, having seen as many as fifty-two cases at the abattoir in Copenhagen within a period of three months.

It would therefore appear that this disease in the udder of the cow is a comparatively rare one.

From my own experience, however, I am of opinion that the udder of the cow is not an uncommon site of the disease, for within the last two years I have examined about fifty specimens of udders for suspected tubercle, and out of that number have found the lesion in five of the cases to be due to actinomyces, or an average of about 10 per cent.

In none of these cases was the lesion observed in any other part of the carcase, so that presumably the infection took place by the teat from the bedding.

Specimen No. 1 was brought in by a veterinary surgeon to have his diagnosis of tubercle confirmed.

The specimen on palpation and to the naked eye had all the appearances of being tubercular. When cut into, the organ was found to contain large numbers of small cream-coloured foci, similar to tubercles, ranging from the size of a pin head to that of a split pea. The substance of the udder was also of a brownish tint, so often seen in cases of tuberculosis of that organ. On *smear preparations* being made in the usual way, and examined microscopically, no tubercle bacilli were found.

Convinced, however, that the specimen was tubercular and that the failure to find the bacilli was due to a small number being present, as I have often experienced, I prepared and cut sections in paraffin.

On staining these sections by Ziehl-Neelson's carbol-fuchsin I was surprised to find the lesion was entirely due to actinomyces.

Specimen No. 2 was similar, both on palpation and to the naked eye.

Smear preparations showed no tubercle bacilli, but many club-shaped elements of actinomyces. Sections also showed the lesion to be that of actinomycosis.

Specimens Nos. 3 and 4 were similar in every way to both the above and showed the elements of actinomyces in both ***smear and section*** preparations.

Specimen No. 5 differed in no way from any of the others, so far as palpation and naked-eye appearance were concerned; but it was of exceptional interest, as it proved to be one of mixed infection; the *smears* showing a very few tubercle bacilli along with many forms of actinomyces.

In this case I found it quite impossible with the naked eye to distinguish between the tubercle nodules and those of actinomyces.

As all these cases were sent in as suspected tubercle specimens, and as the lesion to the naked eye differed in no perceptible way from that of tubercle, by the general routine macroscopic examination practised at the present time, cases of actinomycosis of the udder might readily be put down as being tubercular.

I feel confident from my experience in these cases that if each suspected tubercular udder were subjected to a microscopical examination the percentage of actinomycotic udders would be greater than is generally supposed.

It might also be mentioned that in the annual veterinary inspection of dairy herds I have examined over 500 samples of milk from different cows. Some of these samples taken from cows with what appeared to be marked tubercular lesion of the udder gave negative results on being subjected to animal inoculation. The question arises, Might these not be cases of actinomycosis?

During last winter's inspection a case occurred where the lesion of the udder was markedly nodular and similar to tubercle. A sample of the milk was taken and a guinea-pig inoculated, with negative result. Not satisfied with this result, samples were again taken from all four quarters of the same cow. These again proved negative on animal inoculation.

Smear preparations from these last samples made from the deposit of the centrifugalized milk showed a few acid-fast rod-shaped and a few fragments of club-shaped elements, suggestive

of actinomyces in those taken from both hind quarters and the left fore quarters.

I was unable to procure the udder for further examination, but am convinced it was a case of the disease.

In actinomycosis of the human subject, it is yet doubtful how infection takes place, as the cereal theory has been partly exploded, through cases arising which had no connection with grain, and I think it is just possible infection may be conveyed by the milk of such a cow, as I have just quoted, where the elements of the disease were found in the fluid.

If that be so, this disease as affecting the udder of the cow warrants more attention than is given to it at the present moment in connection with our milk supplies.

(*Journal of Meat and Milk Hygiene.*)

THE MECHANISM OF LARYNGEAL ROARING.

By GEO. H. WOOLDRIDGE, F.R.C.V.S., M.R.I.A.
Professor in the Royal Veterinary College, London.

Before one can proceed to discuss the mechanism of roaring due to paralysis of the left recurrent nerve in horses it is first necessary to consider the variations of the interior of the larynx during normal respiration. During normal inspiration the arytenoid cartilages are drawn outwards towards the wall of the larynx and by that action the vocal cords are also similarly approximated to the laryngeal wall, thus closing the ventricles which are then virtually only potential sacs, and perfectly free ingress of air is permitted.

During expiration the arytenoids and vocal cords are relaxed and the ventricles become actual sacs. This is of small importance as during that action the free edges are directed away from the direction of the air current. In this way then there is no impediment to the ingress or egress of air during normal respiration.

In roaring, however, due to paralysis of the left recurrent nerve, the intrinsic muscles attached to the arytenoid cartilage

of that side are functionless or almost so. Consequently the arytenoid of that side and its corresponding vocal cord are not drawn aside during inspiration and the left laryngeal ventricle remains open with the free margin somewhat loosely directed against the air current.

During rest or only slight exertion this obstruction may not cause any appreciable inconvenience as a sufficient supply of air is allowed without any increased action of the muscles of inspiration.

During work or forced exercise, however, a much larger supply of air is needed and force of the air current is greatly increased. It is then that the open ventricle becomes an obstruction, throwing even greater work on the muscles of inspiration. As a result the ventricle of the paralysed side becomes distended with air, and the air rushing into and out again round the now tense vocal cord produces the sound which, according to the pitch, we designate whistling or roaring. During expiration the air current, of course, is reversed and the ventricle presenting little or no obstruction no abnormal sound is produced. I am of opinion that there is no appreciable vibration of the vocal cord or arytenoid to produce the sound. It would also appear that the difference in the pitch of the sound is due to the degree of relaxation of the arytenoid and vocal cord. Where the dilators of the larynx are only partially paralysed, the ventricle is partially closed and the opening into it being more slit-like, a higher-pitched sound (whistling) is produced than when paralysis is complete and there is no degree of approximation of the vocal cord to the wall of the larynx, in which case the deeper note (roaring) is produced. The degree of respiratory distress corresponds directly with amount of obstruction during inspiration.

Now, if these views are substantially correct, it should be easy to understand how obliteration of the ventricle of the paralysed side should remove both the abnormal sound and the respiratory distress, either wholly or in part. The operation of stripping the mucous membrane lining the ventricle causes the sac to close permanently by the union of its two faces by cicatricial tissue and the main mechanical cause of the obstruction is removed, the vocal cord being firmly bound to the outer wall of the larynx.

I cannot see any advantage in obliterating the ventricles of

both sides of the larynx in unilateral paralysis, and I do not recommend it.

I may be asked to explain those cases in which the operation has conferred little or no benefit. I cannot pretend to explain them all, but I consider that most of the reported failures are due to a mistaken diagnosis, the roaring being due to one of the other numerous causes of roaring and not to paralysis of the left side of the larynx. In other cases, where it is certain there is no error of diagnosis, there is some improvement, but not as much as might have been reasonably expected. In some of those cases the ventricle has not been completely obliterated. That is to say, that in the exercise of the necessary caution not to remove too much mucous membrane, rather too little has been removed, and though the ventricle is closed in its depth, there is still a small sac or ledge at the side of the larynx. Moreover, another very important point must not be overlooked, namely, the dilators of that side of the larynx are still paralysed and some degree of obstruction to inspiration must still be expected. In view of the latter fact, it is remarkable that such good results as have been obtained in some cases could result from the operation.

I have heard it argued against the operation that since we do not know the true functions of the ventricles, we may be doing unknown harm to the patient. With regard to that point I have an easy conscience, since I consider that the functions of the ventricles are entirely bound up in the mechanism of vocalization, and the latter is of very small moment to horses in domestication. If that be the case, then there can be no harm in obliterating it.

A MALIGNANT BONE-DISEASE OF SHEEP (OSSEOUS CACHEXIA) IN NEW ZEALAND.

By H. A. REID, F.R.C.V.S., D.V.H.
Wellington, New Zealand.

An outbreak of osseous cachexia, better known under the more common but less appropriate designation "osteomalacia," occurring as an enzootic affecting sheep, has been for the first time recorded in this country. This disease, which is usually confined to cattle, particularly milch-cows, is characterized by disturb-

ance of nutrition, leading to resorption of calcareous salts from the bones, which in consequence become soft and fragile. The factor chiefly responsible for this abnormal condition appears to be an excess of organic matter and deficiency of lime-salts in the soil upon which the animals are depastured.

Symptoms and Course of the Disease.—This process of demineralization of the bone is slow and insidious in its onset and course. At first only slight loss of condition may be noticeable, indicated by a ragged and unhealthy appearance of the fleece. The wool feels dry and harsh to the touch, has lost its lustre, and may be readily detached. This condition is followed by progressive emaciation. Affected sheep are listless, disinclined to move, lie for a considerable time, and rise with difficulty. When made to walk, they often appear lame, and in well-marked cases a creaking or cracking sound may be heard. Spontaneous fractures are frequent, and sheep may be found with a leg and several other bones of the body broken. Handling affected sheep is liable to lead to fracture of one or other bone. The broken bones do not heal readily, and, as a rule, on the *post-mortem* examination of a severe case, several old calluses may be observed along the course of the ribs, marking the site of former fractures. The bones themselves are extremely thin and light, having been converted into shell-like structures by the resorption of their lime salts. The marrow of the long bones generally is congested, hæmorrhagic, and often gelatinous. The osseous tissue itself appears to be exceptionally porous, and has undergone rarefication.

Microscopically, the changes in the bone are seen to consist of decalcification extending from the periphery, and conversion of the normal elements into a homogeneous matrix. The Haversian system, which has become almost obliterated, is seen to be surrounded by fibrous tissue. The medullary cavities are enlarged, and contain masses of myelocytes. Considerable formation of new, dense, osteoid tissue, which has not undergone calcification, can be observed particularly around the seat of former fractures.

In the case in point, Lincoln crossbred hoggets were affected, the mortality being 8 per cent. of the total attacked. They had been brought from a property on rich, limestone land—which may be designated as Property No. 1—and depastured on alluvial

flat and adjacent hill country (Property No. 2). In about ten weeks' time after their transfer the hoggets were seen to be going off in condition, and exhibited in varying degree the symptoms already described.

In company with Mr. B. C. Aston, Agricultural Chemist, I investigated the nature of the disease. Extracts from Mr. Aston's interesting and valuable report on the result of the chemical analyses of bones from affected animals and soil from the locality are appended. The report bears out the general characteristics of the disease. It is interesting to note that the analysis of the soil in the affected locality, in contrast to the soil of the locality upon which the sheep were formerly pastured, shows the latter to be six times as rich in phosphoric acid; while the result of the bone analysis of one of the diseased hoggets proves it to be correspondingly deficient in the proportion of normal bone salts.

Treatment should be based upon an attempt to return to the soil the diminished mineral salts. Phosphates and superphosphates as manure may be used with advantage. It has been observed that cattle affected with osteomalacia generally seek out and devour bones or shells containing lime, thus endeavouring by instinct to make good the deficiency. An allowance of bone-meal is therefore indicated in treatment, and every attempt should be made to change the diet, and give nourishing food rich in calcium salts, such as crushed oats, bran, oilcake, and chaff. Salt-licks may act as a wholesome tonic. Individual treatment is, as a rule, impracticable, but, should valuable stud sheep become affected, such remedies as cod-liver oil, iron, and arsenic may be administered in suitable proportion.

Following is an extract from Mr. Aston's report:—

Dominion Laboratory, Wellington, December 13, 1909.

C. J. Reakes, Esq., M.R.C.V.S., Director of Live-stock and Meat Division, Department of Agriculture, Commerce, and Tourists, Wellington.

Osteomalacia in Hoggets.

THE analyses of the bones and soil collected by me on my recent visit, with Mr. H. A. Reid, F.R.C.V.S. (Government Veterinarian), to the farms Nos. 1 and 2 of Mr. ——— are given on the attached sheets. The results are most interesting, and show

a marked decrease in the percentage of ash—the chief constituent of which is, of course, calcium-phosphate—as compared with the figures given by authorities for the bones of healthy animals.

Frèmy found in the lamb 67·7 per cent. bone-ash; of which 60·7 per cent. was calcium-phosphate, 1·5 per cent was magnesium-phosphate, 8·1 per cent. was calcium-carbonate.

In the sheep he found 70 per cent. of ash, of which 62·9 per cent. was calcium-phosphate, 1·3 per cent. was magnesium-phosphate, 7·7 per cent. was calcium-carbonate.

The different orders of mammiferous animals do not exhibit any essential differences in the proportion of inorganic matter in the bones, the limits being 64 and 75 per cent.

In osteomalacia the tribasic phosphate of calcium is said by Weber to be converted into the 3/8 phosphate ($8CaO\ 3(P_2O_5)$) and the bones sometimes contain a free acid. In the disease the proportion of mineral matter sometimes diminishes to such an extent that the bones bend under the weight of the body.

Marchant found in the femur of a rachitic child 72·0 per cent. cartilage, 7·2 per cent. fat, 14·7 per cent. calcium-phosphate, 0·8 per cent. magnesium-phosphate, 2·02 per cent. undetermined.

Charles gives the altered composition of bones (vertebra) in osteomalacia as follows: 13·25 per cent. phosphate of lime, 5·95 per cent. carbonate of lime; 0·90 per cent. phosphate of soda and sulphate of lime, 74:64 per cent. ossein, &c., 5:26 per cent. fat.

It will be seen that the amount of organic matter in this analysis is almost identical with the sample of vertebra analysed in this laboratory.

The composition of the bone-ash derived from the bones is normal; the only obvious abnormality in the analysis is the amount of ash when this is calculated on the fresh bones. This bears out the conclusions of Levy (Zeitschr. f. Physiol., Chem. 19), who found the normal relationship, $6PO_4$ 10Ca, is retained in all parts of the bones in osteomalcia.

Cadéac, Leblanc, and Carougeau (" Principles of Veterinary Surgery "), writing on the composition of the soils upon which osteomalacia occurs, mention that Zundel attributes the disease to soils abounding in silicates, which, as a consequence, do not retain water. Hertwig, on the contrary, claimed that clay sub-

soils play an important part. They, however, point out that it is important to note that the disease may occur where the land is rich in calcium-carbonate *and poor in phosphoric acid.* Yogow has attributed the disease to a dearth of calcareous salts in the water supply, and Rossignol, who observed it in animals fed on the by-products of distilleries and sugar-refineries, blamed the poverty of these feeds in phosphates. The character of the soil affects the nutritive value of its flora. The influence of droughts on vegetation has often been responsible for the disease, as it leads to the growth of feeds having a dearth of nutritive elements, especially of salts, which, lacking water as a conveyance, remain incorporated in the soil. The use of phosphates and superphosphates as manure has given good results, according to the authors. The use of fodder obtained from districts where the disease is unknown is also advisable.

In thus summarizing the statements and quotations of this work on veterinary surgery I would point out that the water might be analysed for calcium-salts; but analyses of the soils do not show that calcium-carbonate in the soil is less on the affected than on the healthy country. The liability of country to suffer from drought is certainly greater on the former than on the latter, and is a point worth bearing in mind.

In travelling across the country one cannot but be struck by the difference in the soil and its natural covering at Property No. 1, where the sheep were bred, and at and beyond Property No. 2, where the disease developed. At No. 1 the underlying rock is a soft limestone, and the surface soil an easily-worked loam. The original flora is mixed forest, containing great trees and shrubs one usually finds growing on rich soil. On the affected area the natural covering is manuka, tauhinu (Pomaderris), and rushes, plants usually found growing on poor, dry soil. The difference in the rainfall (including the number of rainy days) must be considerable. I wish to lay stress on the difference in the two types of country, as it appears to me that the sudden change from a rich to a poor soil may have been the largest, if not the sole, factor in the occurrence of the disease.

Considerable time was spent by the owner and myself in taking samples of soil from different sites on his affected block of country. Samples were taken from the tops of high flats and from the valleys. There is very little difference in the results of

analyses of these samples: they are not abnormally different in plant-food content from many of the soils on which sheep are successfully grazed throughout the Dominion. When, however, we examine the analysis of the No. 1 (home farm) soil, the striking fact that it is tremendously rich in available and total (hydrochloric-acid extract) phosphoric acid at once becomes apparent. The quantity of this mineral nutrient available is six times as great as on the affected soils. The total quantity present is at least three times as great.

Following are details of analyses.

B. C. Aston, F.I.C.,
Chief Agricultural Chemist.

Analyses of Bones.

	Ribs. Per cent.	Tibia. Per cent.
Water	24·81	—
Analysis of water-free bones :—		
Organic matter...	71·92	59·56
Ash	28·08	40·44
Analysis of bone-ash :—		
Tricalcic phosphate (Phosphoric acid (P_2O_5)	39·28	39·10
Tricalcic phosphate (Calcic oxide)	46·60	46·15
Calcic carbonate	11·10	11·35
Magnesic-phosphate	0·60	0·50
Silica	0·40	0·50
Iron, alumina, &c.	1·55	1·80

Normal bone-ash (Merillat) :—	Per cent.
Tribasic phosphate of lime	85·87
Tribasic phosphate of magnesia	1·70
Carbonate of lime	8·10
Fluoride of lime	0·35
Chloride of sodium	0·23

Total analysis of bones dried at 100° :—		
Organic matter	71·92	59·56
Phosphate of calcium	24·01	34·44
Phosphate of magnesia	0·16	0·20
Calcic carbonate	3·10	5·01
Silica, &c.	0·11	0·20
Iron, alumina, &c.	0·45	0·72

	Per cent.
Percentage of P_2O_5 in tribasic phosphate	45·80
,, ,, $\frac{3}{5}$ phosphate	48·80
,, ,, phosphate of bone (L.869-70)... ...	45·58

The phosphate is tribasic, and not $\frac{3}{5}$ phosphate.

Analysis of vertebra of hogget :—	
Organic matter...	80·50
Mineral matter...	19·50

Results of Soil-analysis.

	Property No. 1				Property No. 2				Where hoggets were bred
	L 841	L 842	L 843	L 844	L 845	L 846	L 847	L 848	L 849
Soil	Composite Sample of L 841-46 Easily friable; brown sandy clay								Friable; brown, fine, sandy clay
Residue on washing	Small; rock-fragments containing quartz, hornblende, and ferruginous particles								Same as composite sample.
Capillarity	Fair								Good.
Capacity for water	Fair								Excellent.
Reaction to litmus	Faintly acid								Neutral.
Mechanical analysis—	Per Cent.								Per Cent.
Coarse sand	2·0								3·0
Fine sand	51·0								66·1
Silt	10·4								6·0
Fine silt	13·1								7·9
Clay	22·3								14·5
Moisture, &c.	1·2								2·5
	100·0								100·0
Chemical analysis—	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Moisture	1·720	2·060	2·780	3·180	1·940	3·280	3·400	3·380	6·560
Organic matter and combined water	3·120	5·120	6·430	6·200	5·040	6·680	6·240	4·200	11·870
Total nitrogen	0·158	0·213	0·262	0·240	0·170	0·186	0·185	0·122	0·494
Available potash (K_2O)	0·015	0·008	0·015	0·009	0·015	0·010	0·024	0·008	0·024
Phosphoric acid (P_2O_5)	0·021	0·023	0·016	0·020	0·009	0·011	0·007	0·006	0·068
Colour of citric-acid extract on ignition	Brown	Brown	Light brown	Red brown	Greyish brown	Khaki	Light brown	Khaki	Red
Hydrochloric acid extract—									
Lime (CaO)	0·300	0·350	0·160	0·410	0·120	0·120	0·250	0·150	0·300
Magnesia (MgO)	0·380	0·420	0·470	0·240	0·200	0·200	0·310	0·250	0·460
Potash	0·190	0·150	0·160	0·240	0·140	0·130	0·210	0·100	0·310
Phosphoric acid	0·100	0·100	0·070	0·090	0·090	0·120	0·060	0·050	0·340

Clinical Articles.

SPLINTS FOR A HORSE'S NECK.

By T. SALUSBURY PRICE, M.R.C.V.S.
Kennington.

I EXPECT the difficulties I have met with in the treatment of torticollis in horses have also been encountered by other practitioners and that is my reason for recording a method of dealing with those cases which I have found very satisfactory.

Splint for Horse's Neck.

The cases usually result from some accident, such as a fall, and the neck becomes bent towards one side. Sometimes you can forcibly straighten it, only for it to recur immediately. Moreover, the horse is unable to raise his head, which sometimes becomes enormously swollen and œdematous, and the skin of the muzzle abraded by resting on the floor. Under such conditions it is also impossible for the horse to feed and drink. In my opinion the case is usually partial luxation of the cervical vertebræ and severe muscular strain.

The treatment I have adopted with surprisingly successful results in a number of cases recently is to apply splints to the neck, as shown in the accompanying photograph. The splints were made for a larger horse than that to which they were applied for purposes of taking this photograph. There are two splints, shaped to the neck, and attached to each other above and below the neck with two fairly long bolts on the thread of which are thumb-screws. Before applying the splints I wrap several yards of thick flannel round the horse's neck. His head is then held up and the splints applied by removing either the upper or lower bolts. They are then tightened up with the thumb-screws fairly tight, the flannel preventing undue local pressure and any necrosis of the skin. The screws are slightly tightened from day to day. When properly applied, the head is held up automatically and œdema prevented, and the horse usually drinks and feeds easily. As will be seen in the photograph, the horse rests his chin on the front lower bolt and the other lower bolt rests across the front of the shoulders. If it is thought that that support is not sufficient a cord may be attached to the front upper bolt and passed over a beam. It is also wise to put the horse in slings.

In about three weeks the apparatus can be removed and it is gratifying to see that the neck is quite straight again and the patient can raise and move his head about quite normally.

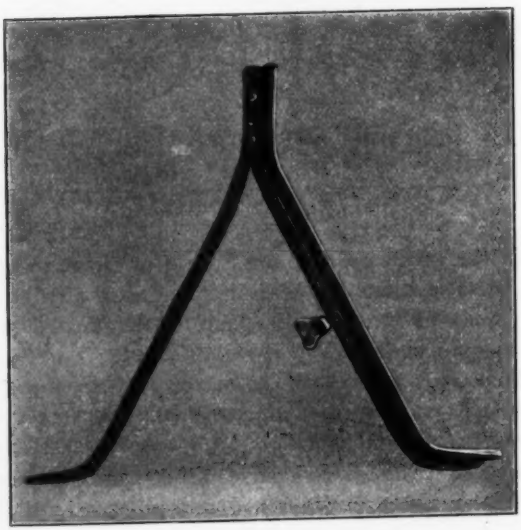
A PORTABLE FOOT-REST FOR HORSES FOR THE TREATMENT OF FOOT AFFECTIONS.

By T. SALUSBURY PRICE, M.R.C.V.S.

Kennington.

One of the greatest difficulties I have met with in the course of many years' practice has been in connection with horses' feet and the thorough dressing of them when affected with such diseases as quittor, &c. The horse, as a rule, is so fidgety that proper dressing is a very tedious matter. I have found that the old farrier's horse foot-rest, which we call the "lazy-boy," is a most useful instrument for holding the foot, whether it be a hind or a fore foot. The instrument is rather cumbersome to carry about in a trap, being a fixed tripod, and so I have had one made, as shown in the photographs, that can be carried about with

Foot-rest in Use.



Foot-rest closed for Portability.

ease. It simply has a detachable leg, which fastens on by two fixed bolts, and a thumb-screw for use. When not in use the detachable leg can be removed and screwed on to one of the other legs and so will be perfectly flat on the floor of the trap or other conveyance. The "lazy-boy" is also very useful to raise a foot forward for the purpose of clipping coronets, pasterns, and fetlocks.

When in use the instrument is kept steady by one's foot, and if the horse's leg is fully extended, it is remarkable how steadily he holds it, and the whole operation of dressing is much facilitated.

FRACTURE OF FOURTH AND FIFTH SACRAL, AND FOURTH, FIFTH, AND SIXTH LUMBAR VERTEBRÆ IN THE HORSE.

By J. A. NICHOLAS, Captain, A.V.C.
In charge 16th Lancers, Norwich.

The horse in question was being ridden in a point-to-point race at Finningham, Suffolk, when about half-way round the course he caught his hind legs in the ditch on the landing side of the jump. After this he appeared to be going rather badly and made similar mistakes at the remaining fences, especially at the last fence but one, where he practically stopped; but his rider pushed him on again and put him over the last fence. Here the horse appeared practically done and its rider then dismounted. The horse was walked to the railway station (a distance of nearly five miles), the horse falling once on the journey when within a mile of the station, but was able to rise without assistance.

On arrival at Norwich he was walked from the station to the stable (a distance of about a mile); he appeared very stiff about the hind quarters during progression. He was watered and fed. Urine and fæces passed normally.

With the exception of great tenderness about the loins (which the owner thought was a sprain of the muscles in this region) he appeared well enough. This was at 10 p.m. About 3.30 a.m. he fell down and was unable to rise. I was sent for and found the horse showing the following symptoms:—

Complete paralysis of the hind quarters, occasional violent

movements of head and fore limbs; and as the groom described to me, "trying to bite anyone near him." Rectal mucous membranes hot, and hand passed into rectum with difficulty. Conscious.

I informed the owner of the hopelessness of the case, and sent for the cattle-killer, but the horse died before its arrival (5 p.m.) from internal hæmorrhage.

Post-mortem examination revealed: Longitudinal fracture of the spine of the 4th sacral and body of the 5th sacral vertebræ; fracture of spines of 4th, 5th, and 6th lumbar; fracture of transverse processes of 5th and 4th (near side) lumbar; fracture of neural arches of 4th and 5th lumbar, exposing the spinal cord. Quantity of blood in abdominal cavity, rupture of right kidney and post. aorta.

SINUSES IN AND ABOUT THE WITHERS AND THEIR TREATMENT.

By W. STAPLEY, M.D., D.V.Sc., M.R.C.V.S.
Professor in the Melbourne University Veterinary School.

So-called fistulous withers is a common disease in and around Melbourne. From anatomical reasons a fistula of this area is well nigh impossible. Fistula is a surgical term used to express an abnormal opening of some permanency, between normal cavities or canals, or between such cavities and the surfaces of the body. The word sinus means a persistent suppurating tubular tract in the tissues, with but slight tendency to heal, such as is left after the spontaneous opening of an abscess.

Sinuses of the withers do not heal because the sinuous tubes do not afford perfect drainage to the infected tissues. The mucous bursæ and the yellow elastic tissue of the ligamentum nuchæ are tissues that are most difficult to rid of infection. Yellow elastic tissue is practically avascular, and further it is slow when surrounded by pus to become broken down and thus to disappear. It is a tissue resistant to digestive processes.

The cause of sinus of the withers of course is infection. The damaging influences that afford a suitable nidus for infection are probably many. I shall not deal with them exhaustively but imperfectly, as occurring to me in a general way and not as the result of directed observation or inquiry. Australian and New

Zealand horses are brought in from work and turned into a paddock for a roll before being fed. This custom adds to the comfort and happiness of the horse. From time to time horses bruise their withers during rolling. I am not prepared to advance any speculative remarks that the gain to health horses may derive from the habit of rolling compensates the risk they run of bruising their withers, any more than I am prepared to assert that the gain of health to boys compensates the risks they incur by playing football. It is as difficult to stop horses rolling as it is to stop boys playing football. I have no desire to reform these habits.

A bruise of the withers in the region of the bursa that minimizes the friction between the funicular portion of the ligamentum nuchæ and the spinous process results in what with licence may be termed a synovitis—a synovitis that lacks the influence of articular cartilage as exists in a true joint. If rested the synovitis abates and the bruised tissues again become normal. If the area be further bruised by harness and infection be, as it were, rubbed in through the skin, an abscess results. Thus a dissecting abscess occurs in and about such specialized tissues as the ligamentum nuchæ and its bursa. With the further developments that occur in these cases it is an easy matter to classify this surgical condition thus:—

(*a*) Synovitis of the bursa.

(*b*) Dissecting abscess of the bursa and the contiguous tissues.

(*c*) Sinus formation. Hyperplasia of connective tissue, areas of tissue waterlogged with œdema, areas of tissue dead or tissue that is dying and very sensitive.

(d) Complicated cases that have involved the thoracic spines or extended by wide tissue destruction to distant tissues.

A synovitis of the withers should not be opened, but it should be treated by rest. Infected cases must be opened freely. There is only one incision that gives free access to the area of disease. It is a line parallel to the vertebral border of the scapula, midway between it and the supraspinous ligament. At the cephalic border of the scapula, the incision is extended downward and forward at an angle of 45° for several inches. This incision severs skin, deep fascia, and the trapezius muscle. The trapezius is wounded for the advantage of free access to the disease. This long incision lays bare the region of the bursa and the rhomboid muscle. It undoubtedly has great advantages over any other incision.

Vertical incisions afford no space in which to attack the diseased tissue. It is to be regretted that in this day of advanced surgical method from time to time accounts of injection methods of treatment appear in the journals. Such treatment is not surgical. It is a destructive hit or miss shot of irritating fluid fired into hidden tissues. It is a fortunate fact that recovery does follow any or no method of treatment in a certain number of cases. We are not concerned with that phase of disease. Surgery is founded on definite principles, one of which is: No more tissue shall be destroyed than the case demands and such destruction shall be under the control of the knife. We recommend the destruction of the trapezius muscle by the knife because that muscle blocks the way of the surgeon to the diseased area, and it should be remembered the trapezius is a muscle of very little use to the horse.

I would add that this incision has been adopted by several Melbourne practitioners with very successful results.

COUNTER-IRRITATION AS A DIAGNOSTIC AGENT.

By R. FERGUSON STIRLING, M.R.C.V.S.
Horsley Woodhouse, Derbyshire.

I REMEMBER when I attended lectures delivered in Ireland by one of the Editors of this Journal, he carefully placed before his students the advantages and disadvantages of the use of counter-irritation in pulmonary disorders. As far as I can remember the disadvantages had it. He preferred hot blankets. Since then in the medical and veterinary journals and papers opinions have varied largely. The sequence, as far as I can recollect, in the medical papers was somewhat like this. No counter-irritant, cold water applications, ice bags, hot water applications; and in the various parts of the country you find men who are practising one of these various methods.

Now, I myself am quite open to conviction on the subject of the use of counter-irritation as a curative agent, as owing to my limited experience and the multitude of opinions I am not able to satisfy myself up to the present as to which of the many sides I am a humble adherent.

But this I do wish to put forward in the hope that I may be either established in my opinions or corrected.

During my time in practice I have frequently been called to cases in which the symptoms pointed rather to pulmonary trouble, but which were most distressingly vague.

Often all you can discover is that the animal is "off colour," temperature raised, pulse not greatly altered, some slight blowing, and a definite dullness over some portion of the pulmonary area. Now it is this dullness that baffles me—it is often so indistinct and so limited in extent that one wonders if there is any difference in sound at all. In such cases I apply mustard to the dull area—sometimes not larger than a saucer in a horse or cow. In twelve hours, or even sooner, I have always found that if there was any pneumonia one could distinguish it quite easily before one got the pneumonic pulse and the other evident symptoms.

I take it that in these cases the pneumonia has been what one might call a central pneumonia and that the reason for the indistinct nature of the sounds heard on auscultation was simply the distance these sounds were from the ear when applied to the thoracic wall. We have all heard of cases where a patient has been attended for some other disease and then days afterwards pneumonia had appeared in a very aggravated form. What was the reason? Was it because the pneumonia remained central for some little time and the symptoms other than those thoracic had been vague and misleading?

Why the mustard so acts to produce the increased pneumonic sounds or bring them nearer to the ear I shall not attempt to explain, I simply state my experience for what it is worth in the hope that it may be of service to some other young practitioner, who, like myself, feels there is so much yet to be learned.

AN UNUSUAL FOSTER-MOTHER.

By R. A. PHILP, F.R.C.V.S.
Brentwood.

The accompanying photograph shows a rather unusual case of a heifer acting as foster-mother to two lambs. The two lambs are orphans, and when three days old they got into a shed with a newly-calved heifer and commenced sucking her of their own accord. She did not mind them in the least, but took very

Heifer Suckling Lambs.

kindly to them and suckled them along with her own calf. The latter was the only one who disagreed with the arrangement, and it was rather amusing to see how he butted the lambs out of the way when he wanted his meals.

The third lamb in the photograph has nothing to do with the case.

UNEXPLAINED MORTALITY AMONGST BIRDS.

By T. G. PALGRAVE, M.R.C.V.S.
Department of Agriculture, New South Wales.

On February 24, 1911, I received a message from Mr. Le Soeuf, Curator of the Zoological Gardens, Sydney, New South Wales, asking me to visit the Gardens as soon as possible.

On reaching the Gardens about half an hour later, I was informed by Mr. Le Soeuf that a wild duck and a pelican had died, and that a swan, a pelican, and a wild duck were very sick, the swan and the pelican being almost *in extremis*.

All the birds referred to above, together with several wild geese and other species of wild duck, were kept in a grassy

enclosure, well sheltered by trees and long grasses, and having an ample sheet of artificial water, which water appeared of excellent quality within the enclosure.

The birds within this enclosure are fed on biscuit softened in water, the biscuit being good and fresh, and on fish which is also obtained fresh as required.

Though the fish is, of course, the food of the pelicans, yet the other birds will often gobble a morsel when they can get it.

The first pelican—whose carcase had been removed—died on February 23, and it was then that the other birds were observed to be sick.

The symptoms observed were the same in all the cases, namely, vomiting, purging, the excreta being dirty green in colour, and a limited paralysis of the legs, the birds being able to swim feebly, but being quite unable to stand; all food was refused, but there was no abnormal thirst. In the cases of the pelicans there was marked emphysema of the necks before death.

Mr. Le Soeuf informed me that a careful search had been made through the enclosure on the chance of finding something in the shape of debris of food or any material which might account for the cases of illness, but all that was found was some fragments of what are commonly known as "puff-balls," a species of fungus, and these fungi had evidently been partly eaten, presumably by the birds in the enclosure. It appeared both to Mr. Le Soeuf—who I should mention is a graduate of the Melbourne Veterinary College—and myself that the treatment indicated was antiseptic and stimulant, and though we had little hope of a successful result, we administered to the swan and the pelican two minims each of liquid carbolic acid, and half a dram each of whisky, in half an ounce of water each. The sick duck was in the centre of the sheet of water and all efforts to secure it proved unavailing. The swan—which was of the white variety—and the pelican weighed, roughly, about 40 lb. each. I need hardly say that the treatment mentioned was only emergency treatment, having no other suitable drugs at hand. The swan and the pelican had been laid in the shade inside an enclosure fenced with corrugated iron and out of sight and reach of the public. As already mentioned, these two birds were practically *in extremis* when we dosed them, and they died within three hours.

We made *post-mortem* examinations on the wild duck which had died prior to my arrival, the swan, and the pelican, with the following results:—

Wild Duck.—Intestine normal, lungs emphysematous and containing a good deal of sanguineous fluid, auricles of heart much dilated and full of dark clotted blood, liver normal.

Pelican.—Stomach normal, intestine showing slight inflammation, but not enough to account for death, lungs emphysematous and full of sanguineous fluid, heart normal, liver normal, carcase very fat and flesh dark coloured and flabby, having a sodden appearance, marked emphysema of tissues of neck and breast.

Swan.—Intestines, liver, lungs, gizzard, and heart normal.

On conclusion of these three *post-mortem* examinations an attendant informed Mr. Le Soeuf that he had caught the sick duck, which we had been previously unable to secure. We therefore decided to take it to the Government Bureau of Microbiology for examination.

On the following morning this duck was alive at the Bureau, and on my calling there, Dr. J. Burton Cleland, M.D., and Mr. T. Harvey Johnston, B.Sc., who had the investigation in hand, decided to chloroform the bird and make a *post mortem.* I wish here to express my appreciation of the courtesy shown, and the trouble taken by these gentlemen in the matter. The results of the *post mortem* were as follows:—

Intestine slightly inflamed, but not sufficient to cause death; lungs emphysematous and containing some sanguineous fluid; liver normal; gizzard normal; heart, both auricles greatly dilated and full of dark clotted blood. In this and the three previous cases the intestine contained a small quantity of greenish fluid fæcal matter.

The blood, fæcal matter, and contents of gizzard were submitted to microscopical examination with negative results.

The gizzards in all cases were almost empty and the stomach of the pelican quite so. The only conclusion I could come to was that these were all cases of ptomaine or fungus poisoning, probably the latter. The slight inflammation of the intestinal tracts and the apparent absence of pain when the birds were observed to be sick, would appear to negative any idea of an irritant poison, especially when we remember that other birds in

the same enclosure and feeding out of the same receptacle for food have remained healthy.

The *post-mortem* appearances also point more to fungus than ptomaine poisoning, as the latter is generally characterized by more signs of enteritis than appeared in these cases. The excessive dilatation of the auricles of both ducks examined is a curious feature, but it is not easy to say what bearing—if any—it had on those two cases. The duration of the illness appears to have been very short, the swan and pelican having died within twenty-four hours of having been observed to be affected, and had the duck, which was taken to the Bureau, not been chloroformed, it would nevertheless have in all probability died very shortly, as it was almost dead at the time it was killed.

All the other birds within the enclosure in which these birds were kept have remained perfectly healthy.

They (the others) are various species of wild duck and wild geese.

I am in hopes that some other member of the profession has observed a similar condition elsewhere and may be able to throw some light on the matter.

It is regrettable that so little has been written on the subject of avian pathology.

Canine Clinical Note.

CYSTIC METRITIS IN THE BITCH.

By GEO. H. WOOLDRIDGE, F.R.C.V.S., M.R.I.A.
Professor in the Royal Veterinary College, London.

Some three years ago (1908) the attention of veterinary surgeons in this country was drawn by several writers to the occurrence of a form of chronic metritis in the bitch. As was pointed out then, the condition is by far the most common in aged bitches that have never been in whelp, though it is occasionally met with in young bitches and sometimes in aged bitches that have bred at one time, but not for some years. All breeds appear to be equally susceptible. The condition would appear to be getting much more common, so much so that it gives one the impression that contagion may possibly account for it, though

it is difficult to see how it is spread in bitches known definitely to be virgin bitches.

The more common symptoms are: Vaginal discharge of a yellowish-grey or chocolate-brown viscid material in varying quantities, sometimes only noticeable by the fact that the bitch leaves a moist spot where she sits. The abdomen has a varying degree of distension depending on the freedom of discharge or otherwise, the distension is bi-lateral and bulging particularly along the lower half of the abdomen, giving the appearance in bad cases of an advanced stage of pregnancy.

In some cases the vaginal discharge is slight, but more or less continuous from the outset and the distension may be absent. There is occasional vomition and I have known gastritis erroneously diagnosed as a consequence. The appetite is usually good in the earlier stages, but later becomes capricious, and in prolonged cases the patient becomes emaciated and may succumb to exhaustion. The temperature is scarcely ever elevated, but may be subnormal in the advanced stages.

In my experience the only satisfactory treatment is excision of the womb and the earlier it is done the better, as the recuperative powers are quite good then and the patient generally makes a rapid recovery from the operation. If the condition is allowed to go on too long, however, the patient becomes a very bad subject for so severe an operation.

When the womb is opened afterwards it is seen to contain a varying quantity of purulent material either yellowish-grey or chocolate coloured, which contains enormous numbers of streptococci, staphylococci, and long and short bacilli. In a case I recorded and illustrated in the VETERINARY JOURNAL of September, 1908, in a small fox-terrier bitch, weighing only 11 lb., the weight of the uterus was proportionately enormous, viz., 2½ lb. The mucous membrane varies in appearance. In some cases it is smooth and quite pallid; in some it is corrugated or thrown into folds, and I have recently met with four cases in which a cystic condition existed and which is responsible for the penning of this note. In some cases the ovaries contain cysts and in others they appear quite normal.

The four cystic cases referred to have all come under my observation during the past month, a circumstance which appears to me somewhat remarkable considering the fact that I have not

previously met with a single instance of it amongst the large number of wombs I have excised and examined. Nor have I seen any record of similar cases. They are as follows:—

Case I.—A twelve-year-old collie bitch that had never been pregnant and, so far as the owner knew, she had never been "lined." She had been ailing for several months prior to being brought to the college clinique on March 17, and as she had got very weak the owner preferred to have her destroyed, which was done accordingly. On making a *post-mortem* examination the uterus was found to be distended to the thickness of a sausage. When opened a greyish viscid exudate was seen. The mucous membrane was quite pallid, almost white, and innumerable cysts extended from the Fallopian tubes along each horn to the body of the uterus. The cysts varied in size from a lentil to a haricot bean and contained a clear serous liquid. They were so numerous that it would have been impossible to place the butt-end of a lead pencil on the surface without coming into contact with a cyst. Both ovaries were cystic, the right one bearing two cysts almost as large as walnuts.

Case II.—An eight-year-old Aberdeen terrier in very fat condition. The bitch was brought under observation in conjunction with Mr. W. Lothian, M.R.C.V.S., of Duns, on March 19, but permission to operate was not obtained until April 1. On that date the womb was removed, the patient being anæsthetized by morphia tart. gr. iss., and a little chloroform after forty-five minutes. In this case the uterus was almost empty, containing only a little greyish exudate. The left horn, however, was very intensely congested along its whole length, and the right horn only along its anterior half. Both horns carried numerous cysts, as in Case I, except that a few of the cysts had hæmorrhagic contents, while the rest contained a clear serous liquid. The ovaries were normal. The bitch has made a perfect recovery.

Case III.—A fat fox-terrier bitch, aged 9 years; she had been vomiting occasionally and discharging per vaginam. She was operated upon on April 21, under morphia and A.C.E. mixture. Both horns contained innumerable very small cysts, none of which exceeded a lentil in size. At the time of writing the bitch is doing well.

Case IV.—The uterus of an aged Great Dane bitch, removed on April 21 by my colleague, Professor Woodruff. The condi-

tion closely resembled that in Case II, being hæmorrhagic but involving both horns and also containing numerous cysts.

Case V.—This case was not cystic, but the uterine mucous membrane presented a mass of coarse villus-like projections. The contents were hæmorrhagic and the ovaries normal. The subject was a cross-bred toy pomeranian, seven years old, in good condition, but the uterine discharge was unusually offensive in odour. She was operated upon on April 19, and is making excellent progress at the time of writing.

On reflecting over these variations, I am of opinion that it is the same disease in all cases, but in these five the cases were diagnosed somewhat earlier than others. In other words, I think it probable they indicate an earlier phase of the chronic metritis.

ROYAL (DICK) VETERINARY COLLEGE, EDINBURGH.

Dr. O. Charnock Bradley has been appointed Principal of the above institution in succession to Professor Dewar, who has resigned. Professor Gofton has been appointed to the chair of Medicine, and the chair of Surgery and Obstetrics thus becomes vacant.

PROFESSOR BRADLEY.

The Governors of the Royal (Dick) Veterinary College are to be congratulated on their choice of Dr. Bradley as Principal. In fact, it would be very difficult to find anybody else who is in any way so well adapted for the position at the present critical stage in the history and development of the Institution.

Professor Bradley was born in Lancashire and commenced his studies at the New Veterinary College, Edinburgh, under the late Principal W. Williams, in 1889, and was admitted a Member of the Royal College of Veterinary Surgeons in 1892. He was then appointed Professor of Veterinary Anatomy in his Alma mater, a position he held until 1900. In that year he was appointed to the chair of anatomy at the Dick College in succession to Professor Mettam on the latter's appointment as Principal of the Royal Veterinary College of Ireland. Dr. Bradley still retains that chair and will continue the duties of his two offices.

In 1900, Professor Bradley obtained the medical degree, M.B., Ch.B. of the Edinburgh University, and as well-earned rewards for research and theses on the development of the brain and liver respectively he obtained the degrees of D.Sc. in 1905, and M.D. in 1907.

Reports.

Indexed B. A. I.

THE CONTROL OF BOVINE TUBERCULOSIS.

THE following is a portion of the Report of the International Commission on the Control of Bovine Tuberculosis appointed by the American Veterinary Medical Association. The members of the Commission are: Wm. C. Edwards, J. N. Hurty, E. C. Schroeder, J. J. Ferguson, J. R. Mohler, T. W. Tomlinson, J. W. Flavelle, V. A. Moore, F. Torrance, W. D. Hoard, Mazyck P. Ravenel, Chas. A. Hodgetts, J. G. Rutherford (Chairman), M. H. Reynolds (Secretary).

In view of the *personnel* of the commission as selected by the American Veterinary Medical Association, and of the fact that so much information on the subject has been made available through the work of similar bodies in other countries and the researches of scientific and practical men in America and elsewhere, the commission has not deemed it necessary to take any evidence either from expert witnesses or others.

The members fully understood that the purpose which their appointment was intended to serve was less the acquisition of new knowledge regarding bovine tuberculosis than the careful study of the knowledge already available and of the thoughts and opinions of those most entitled to speak with authority on the subject.

The conclusions reached in this report are therefore simply the outcome of an earnest and thoughtful consideration of the various modern aspects and phases of the problem, with the object of crystallizing public opinion and so clearing the way for legislative action. They realized also that they could deal with fundamental principles only, and that the details of any policy which they might outline must in each case be worked out by the duly authorized and responsible representatives of the community immediately concerned. They nevertheless deemed it essential to study closely the history of the various efforts hitherto made by such countries throughout the world as have attempted to legislate on the subject. This naturally led to the gradual elimination of all methods other than such as might reasonably be adopted by any community desiring, in the full light of present-day knowledge, to undertake the control of bovine tuberculosis.

It was felt, in view of the prevalence of the disease, especially in some localities and among certain classes of cattle, the difficulty of providing a sufficient number of trained officials, and the large economic questions involved, to say nothing of the enormous expenditure, that it would be unwise, for the present at least, to discuss seriously a policy of universal compulsory testing and slaughter. Such a policy might perhaps be adopted with advantage by a small community, or one in which the disease existed to a very limited extent; but, speaking generally, especially in view of past experiences in this line, it was thought better to omit it entirely from the recommendations of the commission.

All other methods of dealing with bovine tuberculosis which have been recommended or tried in various communities were

thoroughly discussed, with the object of discarding weak points and adopting such features as might be deemed worthy of a place in the official findings of the commission. Every phase of the subject was in this way fully and freely considered, it being thought best to cover the whole ground as completely as possible before coming to a definite decision on any one point. In order to minimize still further the risk of omitting from the deliberations of the commission any phase of the question, four committees were appointed at the first meeting to deal respectively with—

(1) Education and legislation.
(2) Location of tuberculosis.
(3) Dissemination.
(4) Disposition of tuberculous animals.

The appointment of these committees proved to be of the greatest possible value in concentrating the energies of the various members on those branches of the subject with which they were most familiar, and their reports presented at subsequent meetings enabled the commission to reach satisfactory conclusions much more rapidly than would otherwise have been the case. As a means of furnishing information as to the reasons for these conclusions and the manner in which they were reached, the commission would recommend that the reports of the committees should be published as an appendix to this report.

The commission recognizing, after careful study, that the tuberculin test is the fundamental factor in any policy having for its object the control of bovine tuberculosis, decided that a pronouncement to that effect should properly occupy a foremost place.

Based on the information contained in the reports of its committees and on such other information as was brought out in the general discussions of the commission, the following resolutions were adopted for presentation to the American Veterinary Medical Association:—

Resolution 1.—*Dissemination.*—As a general policy to be observed, all contact between tuberculous and healthy cattle and between healthy cattle and stables, cars, &c., which may contain living tubercle bacilli should be prevented. To accomplish this the following specific recommendations are made:

(1) There should be no sale or exchange of animals affected with tuberculosis except for immediate slaughter or for breeding purposes under official supervision.

(2) That the management of live-stock shows should give preference to cattle known to be free from tuberculosis, either by providing special classes for such cattle or in some other practical way, and should also take every precaution to prevent contact between such animals and those not known to be free from disease.

(3) All live-stock shippers should take every precaution to see that cars furnished are thoroughly cleansed and disinfected before use.

Resolution 2.—Tuberculin Test.—(1) That tuberculin, properly used, is an accurate and reliable diagnostic agent for the detection of active tuberculosis.

(2) That tuberculin may not produce a reaction under the following conditions: (*a*) When the disease is in a period of incubation; (*b*) when the progress of the disease is arrested; (*c*) when the disease is extensively generalized. The last condition is relatively rare and may usually be detected by physical examination.

(3) On account of the period of incubation and the fact that arrested cases may sooner or later become active, all exposed animals should be retested at intervals of six months to one year.

(4) That the tuberculin test should not be applied to any animal having a temperature higher than normal.

(5) That any animal having given one distinct reaction to tuberculin should thereafter be regarded as tuberculous.

(6) That the subcutaneous injection of tuberculin is the only method of using tuberculin for the detection of tuberculosis in cattle which can be recommended at the present time.

(7) That tuberculin has no injurious effect on healthy cattle.

Resolution 3.—Evidence from Tuberculin Test.—That a positive reaction to tuberculin in any properly conducted test, official or otherwise, in any animal in any herd shall be considered evidence sufficient upon which to declare the herd to be infected.

Resolution 4.—Compulsory Notification.—That this commission recommends the passage of legislation providing for the compulsory notification by owners and by veterinarians of the existence of tuberculosis in a herd, whether such existence be made known by detection of clinical cases or by the tuberculin test.

Resolution 5.—Location through Slaughter.—This commission recognizes that the discovery of tuberculosis in animals slaughtered for food purposes furnishes one of the best possible means of locating the disease on the farm, and therefore recommends the adoption of some system of marking, for purposes of identification, all cattle three years old and over, shipped for slaughter.

As tuberculosis of hogs is almost invariably due to bovine infection, this recommendation should also be made to apply to hogs of any age shipped for slaughter.

It is further recommended that the discovery of tuberculosis in animals coming under Government inspection should be used, whenever identification is possible, as a means of locating infected herds and premises. All such cases should be reported to the proper authorities for control action.

Resolution 6.—Disposition of Tuberculous Animals.—(The Commission Plan.)—(1) As a general policy in the eradication of tuberculosis the separation of healthy and diseased animals and the construction of a healthy herd are recommended. In order to accomplish this the following recommendations are made: (i) If the herd is found to be extensively infected, as shown by the tuberculin test or clinical examination, even the apparently

healthy animals in it should be regarded with suspicion until they have been separated from the reacting animals for at least three months. If after the expiration of this time they do not react to the tuberculin test, they may be considered healthy and dealt with accordingly. It is recommended that a herd extensively infected should not be treated by the method of general separation, but that the construction of a new herd from the offspring only is advisable. (ii) If the herd is found by either or both of the above methods to contain a relatively small proportion of diseased animals, separation of the diseased animals from the healthy animals and the construction of a sound herd from the healthy animals and the offspring of both are advocated.

As a working basis in carrying out these principles, we advise: (*a*) That herds containing 50 per cent. or more of diseased animals be treated as coming under section (i); (*b*) that herds containing under 15 per cent. of diseased animals be treated as coming under section (ii); (*c*) that herds falling between these figures be graded according to the option of the owner; (*d*) that it shall be the prerogative of the owner to reject either plan and have his herd dealt with by removal and slaughter of diseased animals, with or without compensation, according to the public policy in operation.

(2) That when by any means the officials properly charged with the control of tuberculosis become aware of its existence in a herd to which a policy of slaughter and compensation cannot reasonably be applied, such herd must be dealt with by the owner, under Government supervision, on the principle of the separation of all sound animals from those affected. Such separation must be effected by treating the whole herd as diseased, and rearing the calves separately, either on pasteurized milk or the milk of healthy cows, or, when the number of those affected is so small as to warrant such a course, by the application to the whole herd, from time to time, under official supervision, of the tuberculin test, and the entire segregation of all animals found to react. In the event of any owner refusing or neglecting to adopt either of the above methods, his entire herd to be closely quarantined and sales therefrom to be entirely prohibited.

(3) That a policy of compensation be recommended as useful and usually necessary as a temporary measure.

(4) That when slaughter is necessary, in order to avoid economic loss, every effort should be made to utilize as far as possible the meat of such animals as may be found fit for food on being slaughtered under competent inspection.

(5) The details of the commission plan will be found fully set forth in the appendix to this report.

Resolution 7.—Prevention.—(1) That with the object of preventing the spread of infection persons buying cattle for breeding purposes or milk production should, except when such purchases are made from disease-free herds which have been tested by a properly qualified person, purchase only subject to the tuberculin test. In order to assist in the proper carrying out of this suggestion, the commission recommends that official authorities

should adopt such regulations as will prevent the entry to their respective territories of cattle for breeding purposes or milk production unless accompanied by satisfactory tuberculin test charts.

(2) That all milk and milk by-products used as food should be properly pasteurized unless from cows known to be free from tuberculosis.

Resolution 8.—*Control of Tuberculin Test.*—That this commission recommends the passage of legislation which will prevent the sale, distribution, or use of tuberculin by any person other than those acting with the full knowledge or under the direction of official authorities.

Resolution 9.—*Education.*—As a clear knowledge of the cause and character of tuberculosis among animals, the modes of dissemination, and its significance as an economic and as a public-health problem underlie an intelligent adherence to the principles that must be observed in all efforts for eradication, as well as the establishment of proper co-operation in the great work between physicians, veterinarians, live-stock owners, legislators, and the public generally, it is recommended that a widespread campaign of education be undertaken. To accomplish this end it is recommended that, first of all, a simple pamphlet on bovine tuberculosis be written, in which the language used shall be of such character that every person of average intelligence shall be able to read it without being mystified by technical terms or phrases. This pamphlet should be published with the indorsement of the American Veterinary Medical Association and the special indorsement and consequent authority of the International Commission on Bovine Tuberculosis Control.

Resolution 10.—*Publicity.*—In concluding its work, the commission desires to appeal especially to the press—metropolitan, agricultural, and local—to join in the work of extending as much as possible among the people the conclusions here arrived at. The vital importance of the life of farm animals to the welfare of all classes of society needs no argument in its support. The aim and sole purpose which has actuated this commission has been to arrive at the soundest conclusions possible in the light of the best knowledge obtainable.

Resolution 11.—*Legislation.*—It is recommended that legislation regarding the control and eradication of tuberculosis among domestic animals be made uniform; that the laws of the United States and Canada and other American countries for the admission into America of animals from without be made stringent and as much alike as possible; and that the laws governing the interstate and interprovincial movement of cattle and that between different American countries be harmonized.

The laws governing interstate and interprovincial movement of cattle should be of such character that every State and every province will be free in its eradication work from unnecessary difficulties due to the existence of the disease in other States and provinces.

Legislation is especially required to prevent the various frauds which interfere with the satisfactory use of tuberculin as a

diagnostic agent for tuberculosis, as well as for official supervision over all tuberculin sold to be used by veterinarians and others.

Resolution 12.—*Sanitation.*—In the eradication of tuberculosis it should be kept in mind that, in addition to protecting animals against exposure to tubercle bacilli, it is desirable to make them as resistant to infection as possible. This can be done by stabling them in clean, disinfected, and properly ventilated and lighted barns, giving them abundant clean water and nutritious food, a sufficient amount of daily exercise in the open air, and attending generally to those conditions which are well known to contribute to the health of animals.

The daily removal of manure from stables, and water-tight floors and good drainage in stables are urgently recommended.

Young stock, particularly, should be raised as hardy as possible and should be accustomed to liberal exercise and living in the open.

Resolution 13.—*Immunization.*—That as none of the various methods for the immunization of animals against tuberculosis have passed sufficiently beyond the experimental stage, the commission is unable to indorse any of these for practical use at the present time.

Resolution 14.—*Animal Tuberculosis and Public Health.*—While the members recognize that the subject with which this commission is primarily intended to deal is the control and eradication of tuberculosis among animals as an economic problem, they cannot feel satisfied without declaring their recognition of the fact that tuberculosis among animals is also an important public-health problem. Considered as such, the eradication of tuberculosis among animals should have the approval and support of all those persons who are interested in curtailing human suffering and prolonging human life.

Resolution 15.—*General Statement.*—The members of the commission wish it to be clearly understood that they recognize the limitations of a report necessarily based on actual and not on theoretical conditions. They fully realize that in the event of the policy of which their recommendations form the framework being anywhere adopted even in its entirety, much greater benefit will be derived, at least for some time, from its educative than from its executive features. The control, to say nothing of the eradication, of bovine tuberculosis, is impossible of achievement without the hearty co-operation of all the men who are actually engaged in the cattle industry. In order to secure this co-operation, it will doubtless be necessary in most communities to carry on an active and prolonged educational campaign.

It is apparent that in the dissemination of practical and reliable information regarding the disease it will be possible to employ a very large variety of methods. Many of these methods, such as bulletins, lectures, and actual demonstrations of disease, having already been found valuable, will doubtless continue to be largely used. It must not be forgotten, however, that in this, as in any other educative process, a measure of disciplinary control is

essential to success. Needless to say, such control can be secured only by the passage of legislation which, while clear and comprehensive, must at the same time be sufficiently conservative to avoid exciting alarm or arousing antagonism on the part of owners, especially of valuable herds. The best law ever framed can be made an utter failure by stupid or injurious administration, while, on the other hand, the most drastic legislation can be rendered acceptable if enforced with reasonable tact and diplomacy. Provided, therefore, that these qualities, combined with integrity, thoroughness, and determination, are available for administrative purposes, the members of the commission are convinced that the enforcement of a law based on their recommendations will prove to be by far the most powerful and effective educational agency which could possibly be employed.

In concluding its report the commission would suggest that the association should make such provision as may be necessary to carry on the work either by continuing the commission as at present constituted or with such changes in the *personnel* as may be considered desirable.

Report of Committee on Dissemination of Bovine Tuberculosis.

The sub-committee on the dissemination of bovine tuberculosis respectfully submits the appended report on the means for the dissemination of this disease, based on the present knowledge of the life-history of the tubercle bacilli. The possible means for the dissemination of this disease are enumerated as follows:—

(1) The introduction into a sound herd of an animal or animals infected with tuberculosis of (*a*) those with open tuberculosis, (*b*) those in which the disease is in a period of incubation, and (*c*) those in which the lesions are temporarily arrested.

The last group will not transmit the infection speedily, and possibly may never do so. The first group is certain to spread the virus.

(2) By feeding calves milk, whole or separated, buttermilk, or whey, where the milk has come from tuberculous cows.

(3) By bringing cattle suffering from open tuberculosis into contact with healthy ones at fairs, cattle shows, and other exhibitions.

(4) By shipping healthy cattle in cars not thoroughly disinfected, recently occupied by tuberculous cattle.

(5) By placing healthy cattle in stables that have not been thoroughly disinfected and which were recently occupied by tuberculous animals, as frequently happens with the change of farm ownership or tenants.

(6) Tuberculous animals which do not react to tuberculin, such as those in the period of incubation or latent cases, but which develop active tuberculosis later, are frequently carriers of the virus, although bought and sold as sound animals. These cannot at present be differentiated from sound animals. Therefore all cattle coming from herds in which the disease exists should be

considered as suspicious. The sound herd is the unit to deal with.

(7) Tubercle bacilli may be transmitted by tuberculous cattle running in a pasture to healthy cattle in adjoining pastures where they are separated by a fence of such nature that the cattle may get their noses together.

(8) Tuberculosis in cattle rarely, if ever, occurs through infection from (*a*) man, either directly or as a carrier of bovine tubercle bacilli, (*b*) from other species of animals, or (*c*) by infection from the droppings of cows, buzzards, or other birds or carnivorous animals that have fed upon the carcases of tuberculous cattle.

It is the opinion of this committee that bovine tuberculosis is spread largely through the introduction of tuberculous cattle into sound herds, by the feeding of calves with infected milk or milk products, by exposing sound animals to infected one at fairs or other cattle shows, and by exposing them to infected cars and stables. There are other ways in which now and then it is possible that an animal may become infected, but the means of dissemination mentioned in this paragraph are those to be guarded against in formulating efficient methods of control.

V. A. Moore (Chairman), E. C. Schroeder, M. P. Ravenel.

Report of Committee on Disposition of Tuberculous Animals.

Your committee on the disposition of tuberculous animals begs to submit the following report:—

In the work of control and eradication of tuberculosis in animals it is, first of all, of the utmost importance to establish the presence of the disease in all the affected cattle, since only by such a procedure will it be possible to guard the healthy and newly-born animals from infection.

Fortunately we are in a position to determine with considerable certainty the vast majority of occult cases of tuberculosis in cattle, even the incipient cases, with the aid of tuberculin, and the clinical cases by physical examination. This alone constitutes a great advantage in the work of suppression of the disease. The tuberculin test should therefore be considered as a very important step in the eradication of tuberculosis. As a matter of fact, all the recognized authorities on the subject are agreed on this point.

Once the tuberculous animals are recognized, consideration must be given to the most suitable and economical way of eradicating the disease from the herd. This naturally brings up the question of the disposition of the tuberculous animals, and in adopting any particular method one should be guided by the extent of the infection of the herd, the quality of the affected animals, the sanitary condition of the premises, and, last but not least, the owner's intelligence and knowledge of the subject. The latter information is necessary to determine if reliance can be placed on the owner to carry out minutely all the details

which are essential in executing any particular method of eradication that may be decided upon.

The owner's co-operation in this work is without doubt a very essential feature of this great task. For this reason a campaign of education of the farmers and stock raisers relative to the control of tuberculosis, in which all the advantages of the eradication of tuberculosis must be impressed on them, would greatly facilitate this important campaign. It is a well-known fact that any voluntary method of suppression by the herd owners themselves would bring about better and quicker results than when compulsory measures are enforced upon them by legislative enactments. Nevertheless, the time has arrived when a campaign looking toward the control of this disease should be entered upon by the general Government, as well as the State and the Province. This campaign must reach in the first place all the clinical pulmonary forms of tuberculosis; then tuberculosis of the udder, intestines, and uterus.

Having removed these exceedingly dangerous cases, the balance of the tuberculous herd may be treated by the Bang system, which consists in the establishment of two herds of cattle, one containing the animals which reacted to tuberculin and the other those that proved to be healthy. Each class of cattle is kept entirely separate from the other, in different stables when possible, and under the care of separate attendants, using separate utensils. The calves born of diseased cows are removed from their mothers at birth and placed in the stable with the healthy animals, where they are reared upon the milk of healthy cows or upon other milk which has been properly pasteurized. In this way the healthy portion of the herd constantly increases, while the diseased animals are disposed of as rapidly as may be deemed necessary, until finally all of them are gone and the remaining herd is composed entirely of healthy cattle. The tuberculin test is applied to the healthy herd at regular intervals, annually or semi-annually, in order to detect any cases of latent tuberculosis or recent infection which may appear.

A modification of the Bang system is Ostertag's method of suppressing tuberculosis. This system demands only a clinical examination of the original herd, with the elimination of all open cases of tuberculosis. The calves from the remaining cows are immediately removed and brought up on pasteurized milk in the same manner as in the Bang system, and a new herd is thus established from the young stock. Healthy nurse cows could be used for these calves instead of feeding them on pasteurized milk. The tuberculin test is applied to this new herd at stated intervals in order that any cases of tuberculosis which may develop therein may be discovered promptly.

Neither of these systems, however, has met with much favour in this country, as it requires a considerable length of time and care to create a herd free from tuberculosis by either of them. Nevertheless the inauguration of Bang's or Ostertag's method in herds of valuable animals, whether they be dairy or beef breeds, is unquestionably of an economic value, and in such cases either of these systems should be encouraged. On

the other hand, in ordinary beef or dairy herds the practice of Bang's or Ostertag's method in this country has not met with much encouragement, owing to the extraordinary supervision, time, and labour, as well as the loss of market milk from the reacting cows, which it involves.

In such herds the best ultimate results have thus far been obtained by the obligatory disposal of all the clinically affected cows, and giving the dairyman the alternative either to pasteurize the milk from the remainder of his herd or to be forced to refrain from selling the raw milk from the infected herd at all. In case he adopts the former method, the herd composed of diseased and healthy cattle should be placed in quarantine under the supervision of sanitary authorities, and no sales should be permitted from the herd excepting for immediate slaughter. The alternative method will compel him to dispose of his tuberculous animals in case he refuses to pasteurize the milk.

The suppression of tuberculosis could be greatly facilitated and the co-operation of many of the herd owners could be gained by a provision by which a certain percentage of indemnity could, at least for a term of years, be paid for the condemned animals. The scale for such an indemnity should be arranged in accordance with the final disposition of the carcase under competent inspection.

Another method of eradication should receive serious consideration as being of value in some localities. This is known as the Manchester system, which is either the Ostertag or Bang system applied to localized areas or even individual farms, from which centres the work progresses to surrounding or neighbouring districts and farms.

Inasmuch as the animals affected with clinical tuberculosis are the greatest sources of danger in the dissemination of the disease, compulsory reporting of such cases should be inaugurated by the State, as is now done in many places in the control of human tuberculosis. Mandatory reporting of these cases and their prompt slaughter are very essential, as only by the elimination of these exceptionally dangerous cases can it be hoped to take up all the other details by which a successful control of bovine tuberculosis may be accomplished.

In conclusion your Committee, having regard to the disposition of pure bred cattle, or valuable animals kept for either breeding or dairy purposes, would strongly recommend a system requiring the removal of all clinically tuberculous animals from the herd, the segregation of all calves from the remaining cows in order to establish a new clean herd, the use of tuberculin-tested nurse cows or pasteurized milk for these calves, and the periodic application of tuberculin to this newly-established herd, as the only thoroughly reliable one.—W. C. Edwards, *Chairman*; John R. Mohler, Frederick Torrance.

The Commission's Recommendations on Eradication—A Composite of the Methods of Bang and Others.

The commission, after stating the known facts regarding the nature of tuberculosis and enumerating the principles to be

observed in its prevention and eradication, recommends the following plan of procedure. It is recognized that in several points there are opportunities, in order to meet individual needs, to change or modify the directions herein given. It is understood, however, that whenever such modifications are made they should conform in the greatest detail to the principles laid down in the report of this commission. The plan has for its purpose the conservation of the herd whenever that is possible.

The control of bovine tuberculosis involves a definite procedure under two distinct and different conditions, namely, (1) where a herd of cattle is free from tuberculosis and it is to be kept so, and (2) where one or more animals in the herd are infected and the purpose is to eradicate the disease and establish a sound herd.

Procedure Under First Condition.

The prevention of tubercular infection in cattle free from tuberculosis consists simply in keeping tuberculous cattle or other animals away from the sound ones—in keeping tuberculous animals out of pastures, sheds, or stables where the sound ones may be kept. Healthy cattle should not be exposed to possible infection at public sales or exhibitions. Raw milk or milk by-products from tuberculous cows should not be fed to calves, pigs, or other animals. Cars that have not been thoroughly disinfected should not be used for the transportation of sound cattle. Cattle that are purchased to go into sound herds should be bought from healthy or sound herds only.

Procedure Under Second Condition.

The eradication of tuberculosis from infected herds requires for conservation of the herd different procedures according to the extent of the infection. For a guide to the control of the disease, tuberculous herds may be divided into three groups, namely:—

(i.) Where 50 per cent. or more of the animals are infected.

(ii.) Where a small percentage (15 per cent. or less) of the animals are affected.

(iii.) Where a larger number (15 to 50 per cent.) of the animals are diseased.

In eliminating tuberculosis from infected herds the following procedure is recommended:—

Group I.—Herds where a tuberculin test shows 50 per cent. or more of the animals to be infected should be treated as entirely tuberculous. The procedure here is as follows:—

(1) Eliminate by slaughter all animals giving evidence of the disease on physical examination.

(2) Build up an entirely new herd from the offspring. The calves should be separated from their dams immediately after birth and raised on pasteurized milk or on that of healthy nurse cows. This new herd must be kept separate from any reacting animals.

(3) The young animals should be tested with tuberculin at about six months old, and when reactors are found at the first or any subsequent test the others should be retested not more than six months later. When there are no more reactors at the six months' test annual tests should thereafter be made. All reacting animals should at once be separated from the new herd, and the stables which they have occupied thoroughly disinfected.

(4) When the newly-developed sound herd has become of sufficient size the tuberculous herd can be eliminated by slaughter, under inspection, for beef.

Group II.—(1) The reacting animals should be separated from the non-reacting ones and kept constantly apart from them at pasture, in yard, and in stable. (*a*) *Pasture.*—The reactors should be kept in a separate pasture. This pasture should be some distance from the other, or so fenced that it will be impossible for the infected and non-infected animals to get their heads together. (*b*) *Water.*—When possible to provide otherwise, reacting cattle should not be watered at running streams which afterwards flow directly through fields occupied by sound cattle. The water from drinking troughs used by infected animals should not be allowed to flow into stables, fields, or yards occupied by sound animals. (*c*) *Stable.*—Reacting cattle should be kept in barns or stables entirely separate from the ones occupied by the sound animals.

(2) Calves of the reacting cows should be removed from their dams immediately after birth. Milk fed these calves must be from healthy cows, otherwise it must be properly pasteurized. These calves should not come in contact in any way with the reacting animals.

(3) The non-reacting animals should be tested with tuberculin in six months, and when reactors are found at the first six months, or any subsequent test, the others should be retested not more than six months later. When there are no more reactors at the six months' test, annual tests should thereafter be made. All reacting animals should at once be separated from the new herd and the stables which they have occupied thoroughly disinfected.

(4) The milk of the reacting animals may be pasteurized and used.

(5) Any reacting animals which develop clinical symptoms of tuberculosis should be promptly slaughtered.

(6) An animal that has once reacted to tuberculin should under no circumstances be placed in the sound herd.

(7) As soon as the sound herd has become well established infected animals should be slaughtered under proper inspection.

Group III.—Herds that come within this group should be dealt with either as in Group II, where the herd is separated, or as in Group I, where all of the animals are considered as suspicious, and an entirely new herd developed from the offspring.

General Precautions.

In *all* cases animals that show clinical evidence of the disease should be promptly eliminated. They should be destroyed if the disease is evidently far advanced; if not, they may be slaughtered for food under proper inspection.

All milk from tuberculous cows that is used for food purposes should be thoroughly pasteurized. This means that it must be heated sufficiently to kill or to render harmless any tubercle bacilli that may be present in it. For this it is necessary to heat the milk for twenty minutes at 149° F., or for five minutes at 176° F. It is important that pails or other utensils used in carrying the unpasteurized milk should not be used, unless previously sterilized, for storing the milk after it is pasteurized.

When diseased animals are found, the stables from which they are taken should be thoroughly cleansed and disinfected. To accomplish this all litter should be removed; floors, walls, and ceilings carefully swept, and the floors, together with mangers and gutters, thoroughly scrubbed with soap and water. Thorough cleaning before the application of the disinfectant can not be too strongly emphasized. After cleansing, the disinfectant should be applied. A 5 per cent. solution of carbolic acid, a 1 to 1,000 solution of corrosive sublimate, or a 4 per cent. solution of sulphuric acid may be used. When the stable can be tightly closed, formaldehyde gas, properly used, is reliable and satisfactory.

If tuberculous cattle have been kept in a small yard, the litter should be removed, the surface ploughed, and the fencing and other fixtures thoroughly cleansed and disinfected.

GOVERNMENT BUREAU OF MICROBIOLOGY, NEW SOUTH WALES (FIRST REPORT).

THIS Bureau, which holds the status of a Government Department, has, through its director, issued a valuable and comprehensive first report. The functions of the Bureau apparently embrace a wider field than its title would lead one to infer, for in addition to microbiological work, embracing both plants and animals, for the various State departments, especially those of public health and agriculture, a very considerable number of pathological examinations are conducted during the year. Naturally the bulk of the work of interest to the pathologist deals with the human subject, but many sections are devoted to observations on animal diseases prevalent in New South Wales. In this connection, although strictly correct, it seems rather unfortunate, especially in the absence of a detailed index, that under the sub-heading "Diseases of Animals," those diseases special to the human subject should be mixed up with those special to the lower animals. As an instance, we find a section on gonorrhœa sandwiched between those on tetanus in lambs and swine fever.

Under "Dysentery and Diarrhœa," which commences with the human phase in two short paragraphs, we find a lengthy article on "Diarrhœa in Calves," in which the fact is emphasized that all cases of "scour" in young and newly-born calves are not due to pasteurella invasion, but many probably to fermentative changes; and further, that the administration of pure lactic-acid bacteria in the food, following Metchnikoff's theory, seemed to prove of great value in the treatment of such cases. The cases of tetanus in lambs followed docking by means of the searing iron. In common with others who have noted a liability for tetanus to follow this method of operation, it is concluded that the system favoured the inclusion and development of the tetanus bacillus.

Pseudo-tuberculosis (Lymphadenitis) in sheep has received attention, and it is found the glands of the inguino-femoral and axillary regions are most affected. In this respect, and in the histological details, the observations agree with those of others in regard to this disease. Cocci and a bacillus have been isolated from these caseous glands, but although the bacillus on inoculation into experimental sheep produces similar pathological changes to those found in the naturally affected animal, yet "observations made . . . . have not identified it with the *Bacillus pseudo-tuberculosis ovis*, Preisz," which seems unexpected in view of the detailed report by Cherry and Bull in Victoria, and also that by Gilruth in New Zealand of the same disease, which they identified as being identical to that in Europe and America, and due to the same bacillus described by Preisz, Nocard, Norgaard, and others. Swine fever is simply noted as having been suspected in specimens received for examination. Bovine mammitis at an agricultural college is recorded, and from some cases a streptococcus was isolated. A vaccine was prepared and "injected in the usual way into eight mammitis cows, four other cows untreated being kept under observation as controls." The vaccination, as to the details of which no information is given, was "without beneficial results," consequently the Director states he is "not prepared to pass judgment on the prospects of vaccine therapy in this condition," for he suggests a non-pathogenic streptococcus may have been used. More detailed information as to the procedure would have, however, been interesting. "Endemic Hæmaturia (South Coast Redwater) in Cattle" receives much attention. Dr. Burton Cleland, Principal Assistant Microbiologist, especially has made a number of observations on the condition, which has been recorded in the Mount Gambier district of South Australia, as well as the South Coast of New South Wales. The affected animals are anæmic, and blood escapes along with the urine. The chief lesion noticed *post mortem* is that of multiple angiomatous papillomata of the bladder, which serve to account for the presence of blood in the urine. The cause has been popularly ascribed to different plants, but experiments with these proved negative. Protozoa and also bacteria are considered improbable as causative agents of the bladder lesions, and it is suggested that the cause of the condition

may be similar to the hitherto undetermined cause of angiomata of the liver (usually considered congenital), so frequently met with in cattle, sheep, and even man. A footnote to this section mentions the presence of pentastomes in the mesenteric glands of such Redwater cattle, but it is admitted "the relationship is not apparent at present," and it may be added here that to those who have studied pentastomes any relationship would be surprising.

Jaundice in lambs and balanitis in sheep also receive notice, but no light is thrown on the incidence or cause of such conditions.

On the whole, so far as diseases treated are concerned, the report chiefly deals with historical or other data, interesting and necessarily requiring record, but unless with certain experiments on feeding with plants suspected of being disease-producing, and which proved negative, the record of experimental work and even of original observation is meagre. Nevertheless, the report is a valuable document to those engaged in the study of animal diseases in Australia, and serves to co-ordinate and crystallize the information available regarding their incidence, with the addition of further observations of cases which have come under the officers' own immediate review. We look, therefore, to good experimental and research work following this report. We would only suggest that the Bureau could, with benefit, add to its able staff a skilled veterinary pathologist, who could bear in mind points regarding hygiene, feeding, and general management of stock that may be overlooked by those with a purely scientific training, not combined with practical experience of conditions likely to deleteriously affect the domesticated animal.

As is to be expected from a Department so closely concerned with the public health, milk receives great attention and many pages are devoted to its bacteriology, and a section of this records an exhaustive investigation into the effects of commercial pasteurization of milk as carried on in Sydney. This is so instructive and so valuable to all those interested in a pure milk supply, and affords such conclusive proof that safety in relation to this product as a food, especially for infants, is to be looked for more from proper inspection and control of dairies, &c., rather than from such methods as what may be termed by vendors "pasteurization," that we propose to publish almost *in extenso* this section of the report. Meanwhile some of the conclusions of the Director, Dr. Tidswell, for example, that "pasteurization is not a hygienic but purely a commercial process," and further, that "it confers no particular benefit to the consumer, but rather the reverse," are worthy of especial emphasis.

The parasitological work of the Bureau has been of a most varied description and includes the various fungoid forms of parasites infecting fruits, cereals, vegetables, &c., especially the potato, wheat and maize, besides a disease of the banana plant, which affords a good example of secondary invasion of diseased tissues by saprophytes. Protozoan parasites—spirochætes, trypanosomes, sarcosporidia, and particularly sporozoan hæma-

tozoa—are recorded from a number of animals (mammals, birds, and reptiles). But metazoan parasites of Australia have received a larger share of attention. In addition to useful lists of parasites already recorded from man, domesticated animals, monotremata, and marsupials in the Commonwealth, descriptions in fuller detail of several new species of cestodes (from the laughing jackass, jabira, sparrow, and a lizard), and a new nematode (from cattle) are included, although naturally much of this has already appeared as original articles in scientific journals by the officers of the Bureau.

From the veterinary point of view the nematode *Onchocerca gibsoni* is the parasite of most interest on account of the action of the British authorities in condemning portions of Australian frozen meat because of the presence therein of fibrous nodules containing this worm. In addition to a more detailed description of the parasite by Messrs. Cleland and Johnstone than is contained in their former publications, they add an excellent critical account of the history of these "worm nodules" as experienced in Australia and enter into a discussion of their occurrence, their structure, and the effects of the parasite, comparing also its specific location with that of *Onchocerca fasciata* of the camel. After traversing the various possible means of transmission, and deciding on the necessity for an intermediate host, the question of whether that is likely to be a dipteroid fly or a fresh-water crustacean is still left open, but it is to be noted the original host of the parasite is regarded as being either imported cattle from India or buffalo from Timor.

Concerning the work as a whole in parasitology, the workers must be complimented. Almost every class of parasite, plant, and animal are touched upon more or less. The bulk of the work, other than routine work, is systematic rather than economic and experimental in character. Valuable as records of existing species undoubtedly are, especially in a young country—and the important subject of parasitology is only in its earliest infancy in Australia to-day—still one hopes confidently that such a relatively rich institution as the N.S.W. Bureau of Microbiology, as well as academic research, will accomplish work of an experimental nature, which although not to be judged primarily by its positive and economic results, yet demands money, time, and such wealth of professional and non-professional assistance as that with which this Bureau is so well endowed. This is almost assured by the report under review, which contains so much that is good, and the Director, Mr. Tidswell, is certainly to be highly congratulated on the ability and hard work of the staff which has co-operated with him in the preparation of such a valuable publication.

Miscellaneous.

FREE VETERINARY TREATMENT.—The following veterinary surgeons have kindly undertaken the free treatment of poor people's animals needing attention, under the auspices of the North Staffordshire Branch of the Royal Society for the Prevention of Cruelty to Animals: Burslem, Mr. J. T. Allen; Longton, Mr. Tart; Newcastle, Mr. R. C. Trigger; Stoke, Mr. W Coe; Tunstall, Mr. George Smith.

UNIVERSITY OF LONDON.

THE following have been appointed examiners for the Intermediate and Final Examinations in the Faculty of Science (including Veterinary Science for Internal Students for 1911), those marked with an asterisk being appointed Chairmen of their respective boards:—

Veterinary Anatomy.—E. S. Shave (Royal Veterinary College), together with the External Examiner.

Veterinary Physiology.—The External Examiners (*Professor G. A. Buckmaster as Chairman).

Zoology.—Professor H. W. M. Tims (Royal Veterinary College).

Veterinary Hygiene.—*G. H. Wooldridge (Royal Veterinary College), together with the External Examiner.

Veterinary Pathology.—The External Examiners (*Professor Sir John McFadyean as Chairman).

Reviews.

IL PORCO—THE PIG. By Professor F. Faelli. Published by Ulrico Hoepli, Milan.

This is one of the Hoepli manuals destined to educate Italian agriculturists in the primary principles of good breeding and feeding of animals and giving interesting facts on the industrial side of the matter. The work under review deals with the pig, discussing the race, rearing, and industry, in 461 pages, divided into twelve chapters. Italian pigs cannot be said to hold premier positions in the porcine world and native breeders do not appear to have given much consideration to their improvement. The Casertana race is one with good prospects, which has been improved by selection and crossing with the Yorkshire. The Roman pig is rustic and long legged, and the Modinese is also of a semi-domesticated cut, but books such as the manual under review will open the eyes of the Italian breeder to the possibilities of his swine. The chapter on special hygiene, comprising 144 pages, is comprehensive and fully written, and although we have not gone so far as to peptonize food for swine in this country, yet on page 284 we can learn about the process.

Industrial residues, green fodder, roots, cakes (apparently largely used in Italy), among which we notice olive-cake, all come under review and the chapter concludes with some food tables by Wolf and Kellner, which we hope the pig breeder will be intelligent enough to digest and apply.

As a pioneer work on the subject of the pig from the Italian standpoint, the book will probably accomplish part of its aim; at any rate, we hope so, for with the conditions existing in Italy and the material present, there is much leeway to be made up. It is gratifying to see that prominent men are taking an interest in the betterment of animal production and the science of eugenics all the world over and proof that the Italians are not lagging behind in the general movement of advance is furnished by this book. The volume is only one of a similar kind to those which have already been produced in England, France, and Germany by native authors. The illustrations in the book leave something to be desired. The Englishman will not think much of the representation of the small Yorkshire on page 67, and it is time that the synonyms of New Leicester and Middlesex were discarded in reference to this breed. The picture of the large Yorkshire on page 58 is by no means a good one and a Frenchman would not think that the Craounais pig on page 102 had had sufficient to eat. The illustrations of styes and troughs are perhaps the best in the book.

We observe no reference to the advantages of grazing for pigs, perhaps because, as we have indicated, they are so present that familiarity has rendered them obscure.

As the breeds of Italy improve and become perchance more be-styed, the point will come home to the breeders; but in a country with so much sun, the Italian pig is not likely to suffer from too prolonged or close confinement.

G. M.

Translations.

TRAUMATIC ARTHRITIS OF THE HOCK, TREATED BY BIER'S METHOD.—CURE.

By Messieurs DARBOT and AUGUSTIN,

Veterinary Surgeons to the 4th Hussars.

A five-year-old horse, Tison, entered the infirmary on October 12, suffering from a kick on the internal face of the left hock. At this moment there was only a penetrating fistulous wound; no discharge of synovia; the articulation was not affected. Very acute pain was shown when the horse put weight on the limb, and on the other hand the situation and direction of the fistula caused us to fear arthritis as a possible complication. The patient was placed in slings and repeated vesicating frictions made to the hock. Under the influence of this treatment the

fistula slowly cicatrized. The subject could walk a few yards; weight being placed on the foot, but flexion of the hock was very painful and the internal surface of the region was the seat of a very hot swelling, very sensible to pressure. Improvement was not of long duration. The following days swelling increased and lancinating pains appeared. Finally, on November 25, we punctured an abscess which gave discharge to some synovial pus, leaving us no doubt as to the gravity of the complication. The horse was slung again and we tried successively different treatments: injections of silver nitrate, boric acid in concentrated solutions, &c., without success; the same discharge persisted, no weight was borne on the foot, the subject became emaciated, the posterior left limb atrophied, and we feared laminitis in the other foot. Finally, as a last resort, we resolved to try Bier's treatment.

We used Esmarck's bandage, which all regimental veterinary infirmaries possess; we applied it each time with a tension moderate enough to allow introduction of the finger under the indiarubber bandage. The place of application was a few centimetres above the hock joint, and in order to avoid cutaneous excoriation, we put the bandage on over a fine layer of wadding.

On December 14 the bandage was applied from 10.30 to 1 o'clock, and from 3.30 to 7 o'clock. The horse got very excited and anxious at the first application and lifted both his hind feet, being at times in a position of unstable equilibrium; his body was covered with sweat, but gradually he calmed down and the period of excitation, which lasted about fifteen minutes, was followed by a period of complete rest. Lancinating pains became less frequent, and appetite returned.

December 15.—To avoid accidents the horse was suspended before putting on the bandage. This was put on at 8.30 in the morning and taken off at 3.30 in the afternoon. Period of excitation shorter. As at first, we obtained a localized œdema of the hock; the lower part of the leg was not œdematous. The orifice of the fistula gave discharge to an abundant sero-sanguineous liquid; little pus.

December 16.—Application of bandage from 8.30 to 4.30: great improvement; lancinations less frequent; limb resting lightly on toe; less discharge.

December 17.—Application of the bandage from 9 o'clock in the morning to 4.30 at night. The fistula was very narrow and a serous, limpid liquid flowed away in drops.

December 18.—Application of the bandage from 9 to 5; discharge ceased; fistula completely cicatrized; horse suffers much less; fewer lancinations. On this day the temperature, when the exudate could no longer escape, went up a degree, although on previous days it had only varied one-fifth to two-fifths of a degree.

On the 19th we ceased all treatment; the state of the invalid improving daily.

To-day, January 15, the swelling of the hock has much diminished, and the gait is good. Appetite is normal and the

horse is putting on flesh. It is doubtful if he will be used again in the service, but with firing and a long rest he would make a good carriage horse.

This record is interesting, because five applications of Bier's treatment cured a traumatic tarsal arthritis when other reputed treatments applied with care gave no results.

(*Recueil de Médecine Vétérinaire.*)

REMOVAL OF THE OS PEDIS AND RECOVERY.

By Chief Veterinary Surgeon PAUL SCHMIDT.
Békéscsaba, Hungary.

Four years ago last October, I was called to the domain of Count Géza Wenckheim in Csorvas in order to see his Noric stallion which had been suffering from foot lameness for six weeks and which two graduates had been attending unsuccessfully.

On examination I found that the stallion was excessively lame on the near hind foot, the coronet was much swollen, and at the outside there was a round opening the size of a crown, from which, on pressure on the sole, a great quantity of greyish pus and necrotic débris made its appearance.

At first sight I thought that a quittor was present and had the stallion cast, the horn removed, and the fistula laid open, so that I could look into the foot. The internal parts of the foot had sloughed away, the pedal bone was quite discoloured and black, the joint capsule was destroyed, the extensor and flexor tendons loosened so that the coffin bone was only attached to the lateral ligaments.

As the stallion was a great favourite and the cost of treatment of no account, I undertook an experimental operation. I made a correspondingly large opening at the sole, separated the pedal bone from the lateral ligaments, and took it out. There was a piece of bone missing on the outer side of the os pedis, which had been broken by a nail in shoeing. The shoeing-smith denied this when proof of the injury was shown to him immediately after the operation, but imagined that an old stump of a nail was in the foot and that a new-driven one bent at the point and so penetrated to the bone. A piece had become detached from the bone and so caused the profuse discharge at the coronet.

Treatment.—The hoof was syringed out with five per cent. creolin solution, strewn with iodoform powder, and packed with carbolic wadding and bandaged with linen dipped in creolin solution. The treatment was repeated twice daily at first, the foot being placed in a bucket filled with lukewarm 3 per cent. creolin solution for half an hour and afterwards bandaged with iodoform powder and carbonized wadding. The flat foot has grown together somewhat. The wound

at the coronet healed and the sole became covered up, so that the stallion was cured in three months, and in the early spring could cover mares again and be used to cart fodder. On tapping the hoof a hollow sound was emitted.

After covering mares for four years the stallion was sold for 900 crowns to a miller at Oroszhaza, where he is still employed to cart meal and cover mares.

I have delayed publication of this case for so long in order to observe the horse and have until now waited in vain for the foot.

The collegians who do not believe this can confer with the estate manager as to whether it was so. I say this because some graduates to whom I have spoken about the case would not believe me. I have therefore freely given the name of the present owner to whom they may apply.

(*Osterreichische Wochenschrift für Tierheilkunde.*)

A CASE OF ŒSOPHAGISMUS.

By VON HOLWEDE.
Veterinary Surgeon.

The light draught horse, No. 7, "Harry," of the divisional team of the Westphalian Foot Artillery Regiment, suddenly fell ill at 8 o'clock in the morning of March 23, 1910.

After he had eaten up his food at 5 o'clock with a good appetite he passed, shortly after drinking a large quantity of water at 9° C. temperature, through his mouth and nostrils a thready slime mixed with particles of food.

His head was sunk and held out; then, with a coughing sort of noise, discharge was thrown out in jerks.

In the neighbourhood of the neck vermiform contractile movements were noticeable.

Vomition appeared always at intervals of ten to fifteen minutes on March 23, 1910. By pressure on the œsophagus in the neck region this vomiting could be occasioned. The emptied vomit had a sweet stale smell and a slimy thready consistence. Particles of food were no longer mixed with it. Sour masses were never vomited.

The visible mucous membranes were rosy red. The mucous membrane of the mouth was covered with a tenacious stale smelling slime. Temperature about normal, 37.6° C. Respirations, 14 per minute. The pulse was 44 per minute perceptible, moderately strong, equal and regular. Food and water were completely refused. Intestinal movement was active. Dung was passed in moderate quantities; it was well moulded and devoid of foreign matter. There was no sign of respiratory trouble.

On March 24, 1910, at 12 o'clock mid-day, the attacks only occurred at intervals of thirty minutes, and at 5 o'clock in the

afternoon had ceased. Already at 4 o'clock "Harry" has tried to take hay and straw.

On March 25, 1910, there were no longer any appearances of illness, and since then there has been no return of the trouble.

The treatment was as follows: Quietness, untying the halter, rinsing out the mouth with vinegar and water, washing out the nostrils with lukewarm water. On the 24th a hypodermic injection of morphia.

Only soft food was given (bran and crushed oats) and he was brought on to whole oats, hay, and straw gradually. Cautious watering with lukewarm water was especially advised as the cause of the attack was great indulgence in a draught of cold water.

(*Zeitschrift für Veterinärkunde.*)

TRANSMISSION OF TUMOURS BY COITUS IN THE DOG.

By Dr. A. STICKER.

The author recently recorded a case of experimental transmission of a sarcoma in the dog. The tumour had previously been removed from the penis of a dog. Implantations on the skin, in the abdomen, pleura, testicle, bone, mouth, brain, vagina, eye, all showed the production of invading and metastatic tumours.

This experience, already realized in mice and rats, shows that malignant tumours can be experimentally transmitted. An accidental, spontaneous transmission has not, however, been reported although it appears theoretically possible.

To solve the essential question of knowing whether tumour cells lose their infecting properties in the inflamed and bleeding products of the surface of tumours the following experiment was conducted. From a bitch affected with ulcerous sarcoma of the vagina of experimental origin some liquid obtained by light pressure was obtained by a tapering pipette and injected under the skin of the thorax of two healthy dogs. Two tumours developed which increased to the size of a chestnut. A second series of experiences was realized with a spontaneous vaginal sarcoma in a bitch. Two ulcerated masses were removed and implanted under the skin of two dogs. At the point of implantation two voluminous tumours arose.

In other experiments infection was produced at the level of the vaginal vestibule of the bitch by rubbing a tumour (sarcoma) from the penis of a dog on the mucosa, which had been eroded by friction with sea-sand. A bitch which suffered from two ulcerated sarcomatous nodes as large as filberts at the entrance of the vagina was covered by four dogs. The first copulation took place on May 29. For three months and a half nothing was seen on the penis of the dog; at this time, however, a tumour appeared which reached the size of a mulberry and the glands

of the groin tumefied. The tumour reached the volume of a hen's egg and then reduced itself to that of a chestnut and remained stationary. From the 10th to the 17th of July the bitch was covered by three other dogs. On one of them, on the 106th day after, seven nodules the size of a millet seed were noticed on the superior left face of the penis; in ten days they were the size of hemp seeds. The two other dogs remained unaffected.

These facts show the possibility of transmission of tumours by simple contact. They show the reality of examples of contagion reported in man, notably cases of transmission of uterine cancer to the penis (cancer à deux).

(*Revue Générale de Médecine Vétérinaire.*)

SERPENTINE TONGUE IN CATTLE, WITH SPECIAL CONSIDERATION OF ITS SIGNIFICANCE TO THE BREEDER.

By MEYERSTRASSE.

"SERPENTINE tongue" in the ox is a vicious habit which consists in varied and rapid movements of the tongue at the interior and exterior of the buccal cavity and around the commissures of the lips. The head and neck are held in complete extension; the animals then produce a deglutition of saliva more or less mixed with air, which is accompanied by a characteristic noise.

This wind-sucking has nothing in common with that of the horse; it is more prevalent among cattle than the corresponding habit in horses. In certain steadings it degenerates into a veritable calamity; 20 per cent. may be seen affected. This vicious habit is quickly contracted; in fifteen days or three weeks the animals have acquired the habit of playing with their tongue and of projecting it out with serpentine movements. But deglutition of air does not take place at first; it is only acquired afterwards and may be considered a complication of serpentine tongue. At length on full-grown subjects this vice causes astonishing lesions. The bad positions which the animals take during deglutition cause deformity of the dorso-lumbar vertebræ, leading to lordosis or cyphosis; the market value is thus largely diminished, without taking into account the concomitant emaciation. What makes things worse is that the habit is irremediable; very rarely does spontaneous cure occur. Manifestations are identical in young animals and adults; there is only a difference in the intensity of the wind-sucking. Diagnosis is always easy; attentive observation discloses the whole performance. This affection may be distinguished from pica by the abnormal movements of the tongue and the position of the head and neck. It may result from *ennui* due to prolonged confinement in the stall; the spirit of imitation and even heredity appear to have a great influence in the matter. Prophylactic measures seem to be indicated. Putting out on the meadow and isolation of wind-suckers are the chief measures. Against the vertebral deformity a martingale and a muzzle may be employed.

(*Deutsche Tierärztliche Wochenschrift.*)

IS THE CARROT TOXIC?

BY HOLTERBACH.

Indexed c. A. I.

Is the carrot toxic? It seems as if it were not possible to solve this simple question. In any case, the following observation merits attention.

A farmer outside Offenburg possesses a middle-aged cart-mare, employed on the land. One morning the mare was found lying on her side and unable to rise. Temperature 38.7°; pulse full and regular; respiration normal; appetite feeble; excrement and urine normal. There is no tumefaction nor contraction of the muscles of the croup; sensibility quite apparent; she appears nevertheless to be weak on her hind legs. She is unable to rise, although making every effort to do so. One concludes that there is paralysis of the posterior members affecting the flexors and extensors from the stifle to the foot.

What is the origin of this trouble? The history obtained showed that the mare received hay and carrots for three months and that during the day she had had a basketful of these, holding about 60 lb. The animal received for three months this colossal quantity of 60 lb. of carrots a day.

The probable diagnosis was poisoning by carrots, and hydrobromate of arecolin was prescribed.

After some days the mare got up and regained her appetite. For two days she exhibited muscular tremors, but cure was complete.

This observation recalls two other similar cases whose origin was mysterious, observed in 1888 and 1889. In both cases the same symptoms were present: paralysis of the posterior members and diminution of sensibility towards the extremities. In these cases the animals had been fed with carrots.

(*Revue Générale de Médecine Vétérinaire.*)

FEEDING OF HORSES WITH CARROTS.

BY R. FRÖHNER.

IN 1907, Holterbach declared that the carrot (*Dancus carota*) contained a poisonous principle, carotine. He stated that according to the popular idea the carrot possessed vermifuge properties and announced that prolonged feeding can cause the death of white mice and provoke a certain paralysis in the horse.

The same observations are confirmed by those of Thomassen, and on the other hand, Suckow reports that an epizootic of abortion was brought to an end by suppression of this food in the ration. In the middle ages it was held that the juice of the carrot was an ecbolic?

All these observations, however, ought not to discredit the value of the carrot in the feeding of horses. Every horseman

knows the advantages to be derived from them and accidents seldom occur even with a daily dose of 5 kilos. (11 lb.). Some authors grant to the carrot a prophylactic action against glanders.

(*Revue Générale de Médecine Vétérinaire.*)

[The translator recently made a *post mortem* on a six-year-old cart-mare, in which death appeared to be due to excessive feeding on carrots. The animal failed in her hind legs and dropped down dead in the stable in ten minutes. All the internal organs appeared to be perfectly healthy and the brain and heart were examined minutely. The probability was that carotine had occasioned the death. Any readers of these lines and translations who have noticed bad effects from over-feeding on carrots might furnish interesting records of the occurrence.]

TUBERCULOSIS IN THE DOG.

By J. E. JOEST.

It has been found in the Pathological Institute of the Dresden Veterinary School that in the *post-mortem* of dogs for the last twenty years 0·83 per cent. have been found affected with tuberculosis.

The examined dogs showed sub-acute miliary tuberculosis of the liver, with tuberculosis of the portal lymphatic glands, tuberculous kidney, widespread pleural tuberculosis with hydrothorax and affected mediastinal, and sternal lymphatic glands, sub-acute miliary tuberculosis of the lungs, chronic tuberculosis of the left auricular appendages of the lung with cavernous formation, tuberculosis of the bronchial lymphatic glands. There was also an acute tuberculosis comprising widespread local infections (lung, pleura, and liver) coincident with slight blood infection (kidneys). It was a noteworthy fact that the pleura tuberculosis showed great similarity to the typical serous tuberculosis of cattle (Perlsucht).

Bacteriological examination showed that in the great majority of the cases the illness was caused by the tubercle bacillus of cattle.

(*Report of the Veterinary College of Dresden*, 1909.)

THE PROPHYLAXIS OF TUBERCULOSIS IN PIGGERIES.

By EBER.

During the last twenty or twenty-five years porcine tuberculosis has extended considerably in Germany. At the Berlin abattoir, for example, in 1885 there were only 8.70 per thousand carcases affected, whereas in 1905 the number was 47.4 per thousand. The anatomo-pathological conditions found lead to the conclusion that in the great majority of cases porcine tuberculosis is a feeding disease due to the ingestion of milk coming from tuberculous cows.

The creation of co-operative dairies, which in later years have developed greatly, constitutes a powerful factor in the propagation of tuberculosis amongst pigs by facilitating the contamination of the milk of a whole neighbourhood. On the other hand, numerous observations show that even after centrifuging it is possible to find tubercle bacilli in the cream as well as in the separated milk. The prophylaxis which will be the most effective will consist in sterilization or pasteurization of all the dairy residues. In all cases, besides, prophylactic work will be properly completed by the application of all measures having for their end the diminution of cases of bovine tuberculosis, by extension of the raising of pigs on pasture, and by elimination of the chances of transmission of human tuberculosis.

(*Revue Générale de Médecine Vétérinaire.*)

Letters and Communications, &c.

Mr. J. A. N. da Cunha; Mr. L. M. Douglas; Mr. E. W. Greening; Captain Nicholas; Mr. R. E. Philp; Mr. T. S. Price; Mr. R. F. Stirling; Board of Agriculture and Fisheries; Department of Agriculture and Technical Instruction for Ireland.

Books and Periodicals, &c., Received.

"Meat and Food Inspectors' Examinations" (Baillière, Tindall, and Cox); Record of Sports (Royal Insurance Company; Bulletins of the Bureau of Sleeping Sickness; Proceedings of the Royal Society of Medicine; Bureau of Animal Industry, U.S.A.; London University Gazette.

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